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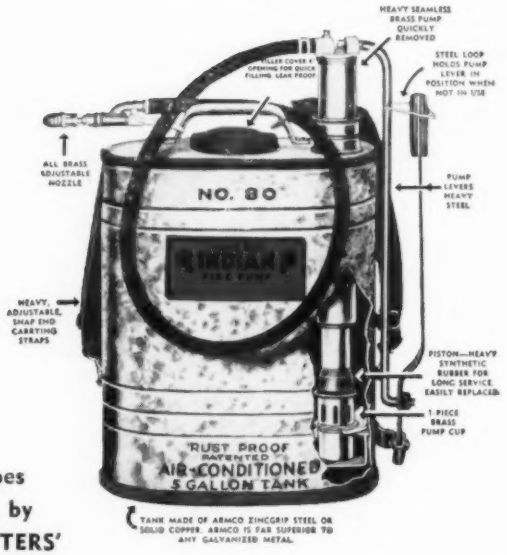
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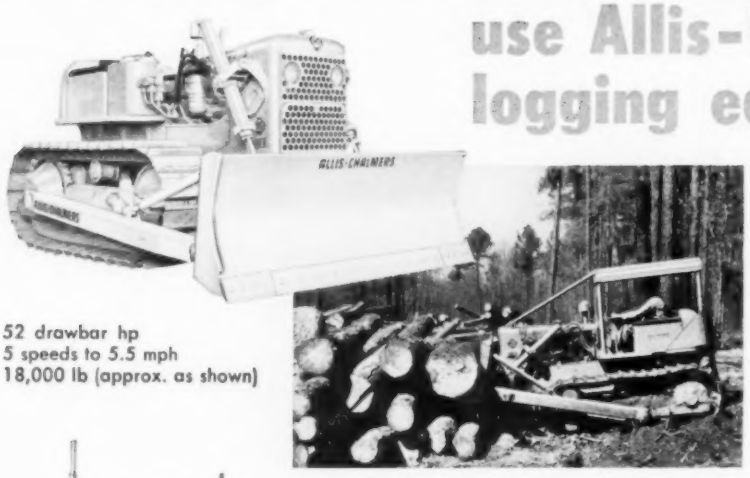

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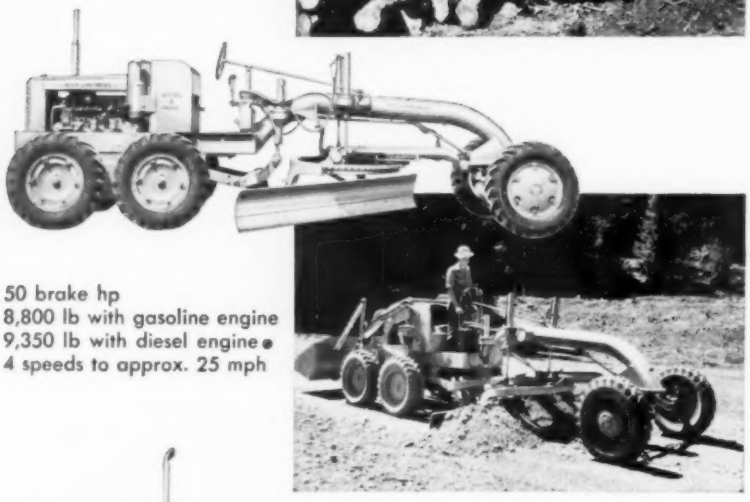

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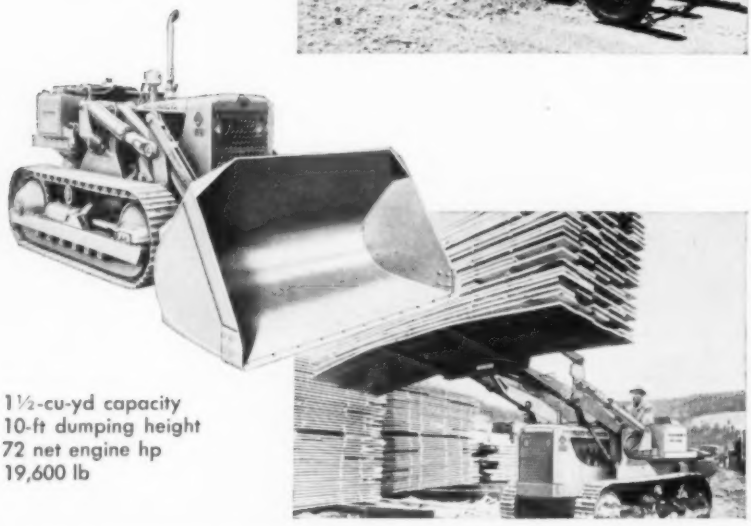

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Silvicultural Possibilities of Fire in Northeastern Washington

Russell K. LeBarron[1]
California Forest and Range Experiment Station,[2] Forest Service, U. S. Department of Agriculture

The article presented below came to the attention of the editors of the Journal of Forestry *only recently. It was originally delivered as a paper at a meeting of the Ecological Society of America, Vancouver, B. C., June 15, 1949. It was not published and hence has received little attention from foresters, the persons who are most interested in the subject. The use of fire as a tool in silviculture has long been debated. The article is being published in the* JOURNAL *because, although not new, it appears to offer an unusually objective analysis of this controversial subject.*

IN 1910, F. E. Clements used the term "silvicultural agent" in referring to the possibility of regenerating lodgepole pine with fire (*2*). How much earlier the idea existed, I cannot say. But within the past 30 years much additional evidence has accumulated to show that fire might be turned to advantage in managing a wide variety of forest types. Therefore, it seems unnecessary to prove again that fire does have excellent possibilities for silvicultural application. Instead, the purpose of this paper is to interpret some more or less well-known facts about fire as an ecological factor and to show how such knowledge can be applied in northeast Washington.

Widespread Abundance of Fire Types

Although the possibility of using fire has been recognized generally, the literature of ecology often fails to bring out the full meaning of fire as an ecological factor. Many forest types depend upon fire for their widespread abundance. For example, Little and Moore (*13*) cited Douglas-fir, paper birch, western white pine, eastern white pine, lodgepole pine, longleaf pine, loblolly pine, pitch-shortleaf pine, and ponderosa pine types. Even this impressive list is incomplete. Jack pine (*15*), trembling aspen (*1*), western larch (*10*), black spruce (*11*), and probably several others, can be added.

Despite the large area occupied by these forest types, there has been a tendency among writers to minimize fire as one of the natural long-standing ecological factors. Perhaps it would be more accurate to say that some writers have improperly classified the status of fire. They have done this by ranking it as a "man-caused" or "biotic" factor.

If proof is needed that classifying fire as a man-caused factor misses the point, one need only look at records of lightning fires. For instance, the Colville National Forest in northeast Washington suffered 529 lightning fires during the 16-year period, 1931 to 1946. This is an average density of about 30 lightning fires per million acres per year. In comparison with the records of many other timbered mountainous districts, the number of lightning fires on the Colville National Forest is rather low. It is true that, today, men start many fires, but organized fire protection goes far toward offsetting increases in numbers of fires. In many regions, there have always been enough lightning strikes to start fires when burning conditions were favorable and fuels were present.

Fire scars on trees show the occurrence and frequency of forest fires under some conditions. Two independent records from scars on ponderosa pine trees can be cited for illustration.

F. P. Keen reported finding a ponderosa pine in eastern Oregon which had been fire scarred 25 times between the years 1481 and 1936 (*8*). This is an average of one fire for each 18 years. Harold Weaver, United States Indian Service, found a ponderosa pine tree on the Colville Indian Reservation, in northeast Washington, which had fire scars showing an average interval of only 7.2 years between 1739 and 1905. The longest period without a scar between these dates was 13 years. The tree was cut for sawtimber in 1944. From 1906 to 1944 it was scarred only once—in 1920. Perhaps it is significant that the two longest intervals without scars occurred after the start of organized fire protection.

Status of Fire as a Factor

The point is that fires ignited and spread with considerable frequency before settlement. Thus there is strong reason to raise fire to the status of an important natural physical factor in plant

[1]The author acknowledges indebtedness to Harold Weaver, regional forester, United States Indian Service, Portland, Ore., for supplying unpublished data on the fire scarred ponderosa pine tree which are cited in this paper, and to J. S. Barrows, Division of Fire Control Research, Intermountain Forest and Range Experiment Station, for statistics on lightning fires.

[2]Maintained at Berkeley, California, by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of California.

succession. Fire does not exert continuous influence as do such factors as water and soil, yet a single burn can undo the accumulated reactions of a plant community which has existed for many years. What would our forests be like if there had been no fires for ten thousand years? Certainly they would have contained far fewer of the trees we prize.

Failure to assign fire proper importance as one of the ruling agents in plant succession results in a tendency to forget that most forest communities reflect a long series of periodic fires. However, Daubenmire, in his textbook, properly generalized the concept that fire is a primary natural agent. He boldly set up fire as a major factor, parallel with soil, water, temperature, and other fundamental forces in plant succession (*5*).

Significance of Fire in Northeast Washington

Now let us consider the part that fire has played in determining the distribution of trees in northeast Washington. The commonest forest types, named for their dominant trees, are ponderosa pine, larch, Douglas-fir, lodgepole pine, and western white pine. They do not correspond to the climax forest communities for which Daubenmire has named several vegetational zones in the northern intermountain region (*4*). As he has pointed out, most of these forest types are intermediate successional stages which have become established as a result of fire or some other catastrophic event.

Daubenmire named four vegetational zones by their climax forest communities as follows: Spruce-Fir, Arborvitae-Hemlock, Douglas-fir, and Ponderosa Pine.

The Spruce-Fir Zone may be occupied temporarily by white pine, lodgepole pine, Douglas-fir, larch, or several other tree species. The Arborvitae-Hemlock Zone may be occupied by white pine, lodgepole pine, Douglas-fir, larch, ponderosa pine, and several other kinds of trees. The Douglas-fir Zone is subject to invasion by ponderosa pine, lodgepole pine, and larch. Only the Ponderosa Pine Zone is unreceptive to other tree species than that for which it is named. However, ponderosa pine grows slowly in its own vegetational zone. Probably the bulk of the sites which are suited to rapid growth of ponderosa pine are situated within the more mesophytic Douglas-fir Zone where the pine is replaced by Douglas-fir in the absence of fire.

Silviculturists generally recognize that three commercially valuable tree species, white pine, ponderosa pine, and larch, are subject to replacement by less desirable kinds of trees. Practical methods for assuring white pine and ponderosa pine regeneration have been the subject of much research. Substantial progress has been made. At one time, regeneration of white pine seemed to be solved (*21*), but the introduction of blister rust seriously complicated the problem (*7*). Today, we think we can successfully regenerate white pine, but the methods are more costly and complex than the earlier systems which did not take blister rust into account (*16*). Search for cheaper and better methods is continuing. The situations of ponderosa pine and larch are somewhat similar. We believe we can prescribe fairly dependable rules for regeneration, but there is need for cheaper, simpler, and surer systems.

The basic requirements for natural regeneration of trees are simple: (1) a source of seed, (2) absence of either seed or advance growth of less desirable competitors, and (3) a favorable seedbed. Artificial reforestation can be substituted for natural seeding, but because of the cost, probably this measure is justifiable only on the more productive sites.

In the search for cheaper and surer ways to create these essential regeneration conditions, foresters have experimented with fire in both the western white pine and ponderosa pine types. Most of the work on white pine has been conducted in Idaho, but some of the burns are located on the Kaniksu National Forest, within the State of Washington. The ponderosa pine burning experiments were performed by Harold Weaver while he was serving as forest supervisor on the Colville Indian Reservation. No specific attempts have been made to regenerate larch with fire, but larch seed trees have been left in some white pine prescribed burns.

Use of Fire in White Pine Type

Logging in western white pine type often leaves large numbers of cull and undersize shade-tolerant trees (*6*), especially hemlock and grand fir. These residual trees usually prevent reestablishment of white pine, partly by direct competition and partly by abundant production of seed.

As early as 1910, the U. S. Forest Service began trials of broadcast burning logging slash and unmerchantable residual timber in Idaho. Somewhat later, the Forest Service also began use of prescribed burning to clean up fire-killed timber on natural burns. The Forest Service has also considered, but has not yet tried, burning off brushfields in old burns. The object would be to facilitate artificial reforestation.

At present, one of the methods for combatting white pine blister rust and regenerating white pine, which is recommended for the national forests of the northern Rocky Mountain region, is burning over the clear-cut areas. This drastic treatment must be followed by planting. Broadcast burning of clear-cut white pine stands creates hot fires which destroy all vegetation and leave the ground in good condition for planting. This method will restore white pine with a high degree of certainty. Disadvantages are cost, destruction of many trees which might become merchantable within comparatively few years, the unpleasant work and risks involved in burning heavy fuels on steep slopes, and possibly injury to the soil and watersheds.

Although regenerating white pine by the clearcut, burn, and plant method is costly, the rapid growth and high value of this species justifies the investment (*14*). Timber removal methods used in the Hungry Horse Dam flowage area, in Montana, possibly may find application in regenerating white pine and help to reduce costs. In the Hungry Horse clearing operation, a heavy wire cable was dragged across the timber between two large tractors. The cable uprooted or pulled down all standing trees that had been left by the loggers. After the trees had dried, they were burned in place. The method was much cheaper than conventional ways of felling worthless timber.

Destruction of residual trees is necessary to restore white pine, but decision to do this is contrary to the natural inclination of foresters. Foresters are conditioned to protect trees rather than to destroy them. An increase in demand for low-grade products, such as pulpwood, possibly would give the residual trees value. Also, some of the trees, which are sufficiently sound and vigorous, may grow to sawtimber size. On the other hand, if the cutover areas are not promptly burned off and planted, it is doubtful if they will ever be put back into white pine.

In 1949, the Forest Service was taking a middle course: it limited burning to stands which were seriously decadent and contained less than 4,000 board feet per acre of sound timber. Burning was further restricted to units which had been chosen for blister rust control. The latter limitation excluded a great many stands.

Possibility of injury to the soil from broadcast burning is an unanswered question in the white pine type. In general, the soils do not erode easily. Furthermore, mosses and liverworts quickly carpet the ground surface on burns. These tiny plants greatly retard splash erosion. The fact that past and present white pine forests necessarily originated after fires—that periodic burns have been the rule for thousands of years—suggests that the vegetation, slopes, soil, and stream channels are adapted to an occasional fire.

But conservationists and the public are taking increasing interest in watersheds, soil erosion, and floods. Foresters will not be completely at ease about prescribed burning unless research proves that it does not harm the soil and watersheds.

Use of Fire in Ponderosa Pine Type

Harold Weaver's experiments with burning in the ponderosa pine type were considerably more diverse in purposes than the white pine experiments which have been described. They were also less costly. However, they required much ingenuity in planning and much skill in applying. He used fire for six distinct purposes as follows:

1. To thin overdense thickets of pine saplings.
2. To destroy Douglas-fir advance reproduction.
3. To improve seedbed conditions.
4. To reduce fire hazard by destroying snags, windfalls, and other natural debris.
5. To eliminate logging slash.
6. To increase growth of forage plants.

Weaver carried out most of his burning within the Douglas-fir Vegetational Zone and some in the Ponderosa Pine Zone. He has described his methods and the early results in several publications (*71*), (*18*), (*19*), (*20*). Briefly, his system consisted of setting fires under burning conditions which permitted them to spread rather readily. Speed and intensity of the fires were limited by burning within relatively small blocks bounded by logging roads, skitrails, and previously prepared firebreaks. At times, direct suppressive action was required.

As might be expected, the results in terms of thinning and debris cleanup were not ideal. In places the fires killed too little, and in places they killed too much. However, the costs were small, and, in the opinion of many foresters, benefits greatly outweighed damages. Weaver's ideas deserve wider testing and use.

As in the white pine type, prescribed burning in ponderosa pine has drawbacks. Some viewers have looked at newly burned areas and flatly condemned the method. Inevitably, some trees are killed or injured that would have grown into useful material if left. Temporarily, the scorched and partly killed advance growth is unsightly. Fire scars on older trees are enlarged. The fires, although light, destroy much litter, which if left would have become incorporated into the humus. Presumably, more organic material is desirable on these relatively dry and exposed sites. Humus improves moisture absorbing and holding qualities of the soil. It retards erosion. But will elimination of fire result in substantially greater accumulation of humus?

Organic material does not continue to pile up indefinitely except in peat bogs and lakes. Much humus is lost by natural oxidation and leaching. These processes would reach an equilibrium with humus formation, if fires were kept out. The question of whether the soil and watershed can be protected while the sites are subjected to periodic burning demands careful study.

Use of Bulldozers

Recently, bulldozers equipped with slash-buncher teeth have come into use as competitors of prescribed burning (*3*). A crawler tractor so equipped can perform several of the same functions as fire. It can push slash, windfalls, and other debris into piles where they can be burned safely. It can tear up the soil surface to improve the seedbed. It can easily rip out undesirable young trees. The costs of bulldozer slash piling, although higher than the costs which Weaver found for prescribed burning, are lower than for conventional hand piling (*3*), (*18*), (*12*).

Bulldozer work has two distinct advantages over burning. There is not the danger of spreading beyond predetermined boundaries, which is

possible in burning. A tractor, unlike fire, is always under the conscious control of the operator. It can be started, stopped, and directed at will. But tractors may also injure watersheds. Soil compaction under the weight of the treads has not been fully investigated. Bulldozer blades expose mineral soil and can create erosion hazards.

Will Fire Types be Maintained?

One other consideration might have a bearing on future practices. This is the possibility that trees which do not require fire, or similar drastic measures for perpetuation, may be chosen for management.

Perhaps owners will decide to grow ponderosa pine only in the Ponderosa Pine Zone, and Douglas-fir only in the Douglas-fir Zone. Similarly, they also could allow grand fir, hemlock, and western redcedar to take over in the Arborvitae-Hemlock Zone, and Engelmann spruce and sub-alpine fir in the Spruce-Fir Zone.

This change actually is happening on a great many areas as a result of selective logging followed by no positive regeneration measures. In the 11-year period between 1933 and 1944, the area occupied by white pine and ponderosa pine types in Benewah County, Idaho, shrunk 168 thousand acres, or 67 percent (*9*).

The prospect that the economically desirable fire species will decline as a result of passive inaction by landowners is not a pleasant one for forest conservationists to contemplate. Experience points to continued need for the tree species which fire has aided in the past. The silvicultural methods involving use of fire, or devices which perform much the same functions, although not perfect, are steps in the right direction. Further research and experience will bring about changes and improvements. It seems safe to predict that fire will find a permanent place in the silviculture of northeastern Washington. We must find ways to prevent the wastefulness of wild fires, yet utilize the forces for good which fire posseses.

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Scholarships and Fellowships Reported Available at Schools of Forestry in the United States and Canada, 1956-1957 Academic Year

THE FOLLOWING listing of fellowships, scholarships, and certain other financial aids available to students at schools of forestry in colleges and universities in the United States and Canada offering instruction in forestry was prepared from questionnaires for the purpose of supplying general information. Details regarding specific aids should be obtained by direct inquiry to the school.

Schools are listed in three groups: (1) Institutions in the United States accredited for forestry instruction by the Council of the Society of American Foresters. (2) Institutions (this is a partial listing) in the United States that offer professional and/or technical curriculums in forestry but that do not meet the requirements for SAF accreditation. (3) Institutions (this is a partial listing) offering professional training in Canada.

Nothing having a financial value of less than $100 in one academic year has been included.

The list is not offered as being uniformly complete in the inclusion of all (1) assistantships and instructorships available to graduate students on a part-time basis or (2) institution-wide scholarships and fellowships, including, but not limited to forestry students. When no mention of these aids is made inquiry as to availability should be directed to the institution.

Information submitted by the institutions has been abbreviated to a skeletonized standard. The key to the numbered items listed is as follows:

(1) Name of the scholarship or fellowship.
(2) Field of study or specialization.
(3) Value.
(4) Number available.
(5) Duration.
(6) Conditions and limitations of award.
(7) To whom candidate should apply.
(8) Awarding agency.
(9) Basis for the award.
(10) Remarks (if necessary).

Users of this list are again cautioned to regard it only as a general guide to availability.

Accredited Institutions

Alabama Polytechnic Institute, Department of Forestry, Auburn, Alabama

(1) E. A. Hauss Scholarship in Forestry.
(2) Forestry.
(3) $500.
(4) One.
(5) One academic year (May reapply for second year).
(6) Applicants from high schools in Alabama and West Florida are eligible.
(7) Head, Department of Forestry.
(8) Mr. E. A. Hauss.
(9) High school record and supporting credentials.

•

(1) Gulf States Paper Corporation Freshman Scholarships in Forestry.
(2) Forestry.
(3) $300.
(4) Four.
(5) One academic year.
(6) Reasonable academic progress.
(7) Dean, School of Agriculture.
(8) The Gulf States Paper Corp.
(9) High school record, placement tests, and interview.

•

(1) Gulf States Paper Corporation Sophomore Scholarships in Forestry.
(2) Forestry.
(3) $400.
(4) Two.
(5) One academic year.
(6) Normal academic progress.
(7) Head, Department of Forestry.
(8) Gulf States Paper Corp.
(9) Scholarship, extracurricular activities, and personality.

•

(1) St. Regis Paper Company Scholarship in Forestry.
(2) Forestry.
(3) $800.
(4) One.
(5) Two years.
(6) Junior, renewable for senior year if academic progress is satisfactory.
(7) Head, Department of Forestry.
(8) St. Regis Paper Co.
(9) Junior standing, scholarship, recommendation.
(10) Selection is made by a committee consisting of company representatives, regional forester of Region 8, U. S. Forest Service, and state forester, Alabama.

Graduate

(1) H. E. Westervelt Fellowship.
(2) Forestry, thesis of interest to pulp and paper industry.
(3) $2,000.
(4) One.
(5) One year.
(6) Graduate of accredited forestry school eligible for full admission to the graduate school.
(7) Head, Department of Forestry.
(8) Gulf States Paper Corp.
(9) Scholarship.

University of California, School of Forestry, Berkeley, California

(1) Charles Lathrop Pack Prize in Forestry.
(2) Forestry.
(3) $100.
(4) One.
(5) Academic year.
(6) Students in residence with a major in forestry. Best essay, composition, newspaper or magazine article on forestry as it affects the public, or from the public point of view.
(7) Dean, School of Forestry.
(8) University of California.
(9) Competitive.

•

(1) Daniel Dineen Scholarship.
(2) Forestry.
(3) $300.
(4) One.
(5) Academic year.
(6) Students in residence majoring in forestry.
(7) Committee on Undergraduate Scholarships, 201 Administration Building.
(8) University of California.
(9) Scholarship, need, character, and promise.

•

(1) The Johnson Award in Forestry.
(2) Forestry.
(3) Each of the best five candidates selected at the beginning of the senior year will receive an award of $100 and upon graduation the candidate then of first choice will receive an additional $150.
(4) ————. See above.
(5) Academic year.
(6) Preliminary selection of candidates will be made by the faculty of the School from students attending summer camp prior to the junior year; and, in order to retain eligibility, the candidates shall have had employment in the forest industries of the state throughout the period of their vacation between the junior and senior years.
(7) Dean, School of Forestry.

(8) University of California (established by late Colonel S. Orie Johnson and California Forest Protective Assn.).
(9) Scholarship and demonstrated aptitude for industrial forestry.

•

(1) Walter Mulford Scholarship in Forestry.
(2) Forestry.
(3) $300.
(4) One.
(5) Academic year.
(6) Students in residence majoring in forestry.
(7) Committee on Undergraduate Scholarships, 201 Administration Building.
(8) University of California.
(9) Scholarship need, character, and promise.

•

Graduate

(1) Baker-Bidwell Research Fellowship in Forestry.
(2) Forestry, research, and advanced study.
(3) $1,500.
(4) One.
(5) One academic year.
(6) Completion of 20 units of forestry courses in school of good standing.
(7) Dean, Graduate Division.
(8) University of California.
(9) Scholarship, evidence of research ability.

•

(1) W. F. Rosecrans Fellowship in Forestry.
(2) Research, advanced study in forest land management in California.
(3) $1,800.
(4) One.
(5) One academic year.
(6) Graduate.
(7) Dean, Graduate Division.
(8) University of California.
(9) Scholarship, evidence of research ability.

Colorado State University, School of Forestry and Range Management, Fort Collins, Colorado

Graduate

(1) Research Assistantships.
(2) Marketing research, range management.
(3) $1,600-$2,000 per year.
(4) Two in each field.
(5) Two years.
(6) Graduate; half-time research work; preference given to those planning to work in Colorado after graduation.
(7) School of Forestry, Colorado State University.
(8) ————.
(9) See above.

•

(1) Research Assistantships.
(2) Wildlife.
(3) $1,600-$1,800.
(4) Indefinite.
(5) Two years.
(6) Graduate; half-time research work; preference given to students planning to work in Colorado after graduation.
(7) Colorado Cooperative Wildlife and Fishery Research Unit.
(8) ————.
(9) See above.

•

(1) Teaching assistantships.
(2) Forest management and utilization, grazing and range management, recreation and wildlife conservation.
(3) $400 per year.
(4) Three, one in each department (see 2 above).
(5) ————.
(6) Graduate, part-time teaching.
(7) School of Forestry.
(8) ————.
(9) ————.

Duke University, School of Forestry, Durham, North Carolina

(1) Duke University School of Forestry Scholarships and Fellowships.
(2) All fields.
(3) $600 to $2,000.
(4) Several.
(5) One, two, and three years.
(6) Recipients expected to devote their time to full program of study and research.
(7) Dean, School of Forestry.
(8) School of Forestry.
(9) Scholarship and need.

University of Florida, School of Forestry, Gainesville, Florida

(1) Florida Forestry Association Scholarship.
(2) Forestry (Forest management, wood technology, wildlife).
(3) $500.
(4) One.
(5) One year.
(6) Junior or senior standing in the School of Forestry.
(7) Director, School of Forestry.
(8) Florida Forestry Assn.
(9) Scholarship.

•

(1) Gair Woodlands Corporation Forestry Scholarship.
(2) Forestry (Forest management, wood technology, wildlife).
(3) $500 annually.
(4) One per year.
(5) Four years.
(6) Eligibility is restricted to residents of Baker, Columbia, Hamilton, Nassau, or Suwannee Counties or any other adjacent county.
(7) Director, School of Forestry, or Gair Woodlands Corporation representative.
(8) Gair Woodlands Corp.
(9) Scholarship.

•

(1) J. B. Adkins Memorial Scholarship.
(2) Forestry (Forest management, wood technology, wildlife).
(3) $400.
(4) One.
(5) One year.
(6) Student registered at the University of Florida at least one year. He must maintain a C average throughout the year to remain eligible.
(7) Chairman, Committee on Student Aid, Scholarships, and Awards, Dean of Men's Office.
(8) All-Bound Box Institute.
(9) Scholarship and need.

•

(1) St. Regis Paper Company Scholarship.
(2) Forestry (Forest management, wood technology, wildlife).
(3) $800 annually.
(4) One per year.
(5) Two years.
(6) Junior standing in the School of Forestry.
(7) Director, School of Forestry.
(8) St. Regis Paper Co.
(9) Scholarship.

University of Georgia, School of Forestry, Athens, Georgia

(1) Gair Woodlands Scholarship.
(2) General forestry.
(3) $500.
(4) One annually.
(5) Four years.
(6) Given to outstanding senior high school student within a 100 mile area of donor's mill.
(7) Chosen by committee named by Gair Woodlands.
(8) Gair Woodlands Co.
(9) Outstanding Georgia senior high school student.

•

(1) Homelite Scholarship.
(2) General forestry.
(3) $500.
(4) One annually.
(5) One year.
(6) Outstanding junior or senior in forestry.
(7) Faculty.
(8) Homelite Corp.
(9) Outstanding junior or senior.

•

(1) St. Regis Scholarship.
(2) General forestry.
(3) $800.
(4) One annually.
(5) For two years.
(6) Given to outstanding junior in forestry.
(7) Faculty.
(8) St. Regis Paper Co.
(9) Outstanding junior in forestry.

•

(1) Union Bag-Camp Paper Corporation Scholarship.
(2) General forestry.
(3) Expenses up to $1,000.
(4) Two annually.
(5) For four years.
(6) Given to an outstanding 4-H Club or F. F. A. member who is a senior in high school.
(7) Recommendations are made by 4-H Club and F.F.A. officials in Georgia.
(8) Union Bag-Camp Paper Corp.
(9) Outstanding Georgia high school senior.

University of Idaho, College of Forestry, Moscow, Idaho

(1) Crown Zellerbach Foundation Forestry Scholarship.
(2) Forestry and allied fields.
(3) $250.
(4) Two.

(5) One year.
(6) Outstanding junior or senior in College of Forestry.
(7) College of Forestry.
(8) Crown Zellerbach Foundation through the University of Idaho.
(9) Competitive — upon recommendation of College of Forestry staff.

•

(1) Potlatch 4-H Club Scholarship.
(2) Forestry.
(3) $100.
(4) One.
(5) One year.
(6) Demonstrated interest in 4-H Club forestry work and high quality high school grades. Limited to freshman entering the College of Forestry.
(7) Forestry Extension Division, University of Idaho.
(8) Potlatch Forests Foundation through the University of Idaho.
(9) Competitive.

•

Graduate

(1) Consul General Foster Forestry Scholarship.
(2) Forestry or range management.
(3) $1,200 per year.
(4) Two.
(5) Two years.
(6) Graduate, one to student from South America, one to student from South Africa, interest in revegetation and erosion control.
(7) Executive Dean or Bursar, University of Idaho.
(8) Consul General Foster through the University of Idaho.
(9) Recommendation of the University where undergraduate degree was obtained.

•

(1) Forest Management Research Fellowship.
(2) Forest pathology, at present.
(3) $1,740 per year.
(4) One.
(5) Two years.
(6) Beginning graduate in forest management, training or interest in forest pathology.
(7) College of Forestry.
(8) University of Idaho.
(9) Competitive upon application.

•

(1) Potlatch Forestry Fellowship
(2) Wood utilization.
(3) $1,500 per year
(4) One.
(5) One or two years.
(6) Graduate, no work required, undergraduate training in wood technology or wood utilization.
(7) College of Forestry.
(8) Potlatch Forest Foundation through the University of Idaho.
(9) Competitive, high quality undergraduate work.
(10) Awarded only if outstanding individuals are obtained.

•

(1) Range Management Research Fellowship.
(2) Range management.
(3) $1,740 per year.
(4) Two or three per year.
(5) Two years.
(6) Beginning graduate student.
(7) College of Forestry.
(8) University of Idaho.
(9) Competitive upon application.

•

(1) Sears-Roebuck Research Grant.
(2) Tree farm forest management.
(3) $1,740.
(4) One.
(5) Three years and terminal.
(6) Student must work on tree farm research project for which the College of Forestry receives other monies.
(7) College of Forestry.
(8) Sears-Roebuck Foundation through the University of Idaho.
(9) Competitive.
(10) Fellowship will terminate at the end of three years unless extended.

•

(1) Wildlife Research Fellowship.
(2) Wildlife or fishery management.
(3) $1,000 first year, $1,620 second year.
(4) Three or four.
(5) Two years.
(6) Graduate, undergraduate work in wildlife.
(7) College of Forestry.
(8) University of Idaho and Idaho State Fish & Game Commission.
(9) Competitive upon application.

Iowa State College, Department of Forestry, Ames, Iowa

(1) Iowa Hoo Hoo Club Forestry Scholarship.
(2) Forestry.
(3) $200.
(4) One.
(5) One year.
(6) To sophomore who has completed three quarters of college work in forestry, Iowa resident.
(7) Department of Forestry.
(8) Iowa Hoo Hoo Club.
(9) Scholarship, need, promise in field of forestry.

Louisiana Polytechnic Institute, Department of Forestry, Ruston, Louisiana

(1) Kellogg-Crandall Forestry Scholarship.
(2) General forestry.
(3) $400.
(4) One each year.
(5) Four years.
(6) Only high school graduates of Ouachita Parish, La., are eligible.
(7) Department of Forestry.
(8) Department of Forestry.
(9) Need, scholastic ability, and good character.

Louisiana State University, School of Forestry, Baton Rouge, Louisiana

(1) Calcasieu Paper Company Scholarship.
(2) Forestry.
(3) $600 per year.
(4) One.
(5) Four years maximum.
(6) Must be from one of certain western Louisiana parishes; must maintain 1.5 grade average or higher.
(7) Director, School of Forestry.
(8) College of Agriculture, Louisiana State University.
(9) Scholarship and need.

•

(1) Homelite Scholarship.
(2) Forestry.
(3) $500.
(4) One.
(5) One year.
(6) Junior or senior.
(7) School of Forestry.
(8) College of Agriculture.
(9) Need, leadership, scholarship, promise of professional achievement.

•

Graduate

(1) Gaylord Foundation Fellowship.
(2) Forestry.
(3) $450.
(4) One.
(5) One year.
(6) Graduate.
(7) Director, School of Forestry.
(8) School of Forestry.
(9) Outstanding all-around student.

University of Maine, Department of Forestry, Orono, Maine

(1) _____.
(2) General, including forestry.
(3) Varying.
(4) Varying.
(5) _____.
(6) _____.
(7) Department of Forestry.
(8) _____.
(9) _____.

•

(1) _____.
(2) Forestry.
(3) Varying.
(4) Varying.
(5) _____.
(6) _____.
(7) Department of Forestry.
(8) _____.
(9) _____.
(10) Grants are given by various groups on a non-recurring basis and vary from year to year.

University of Massachusetts, Department of Forestry and Wildlife Management, Amherst, Massachusetts

Graduate

(1) Cooperative Wildlife Research Fellowships.
(2) Wildlife management.
(3) $1,500 plus travel and equipment.
(4) Three, on alternate years.
(5) Two years.
(6) M. S. candidates.
(7) Dr. William G. Sheldon, Cooperative Wildlife Research Unit, University of Massachusetts.
(8) Massachusetts Division of Fish and Game; Wildlife Management Institute; U. S. Fish and Wildlife Service.
(9) Scholarship.

•

(1) One-half Time Agricultural Research Instructorship.

(2) Wildlife management.
(3) $2,100 plus travel and equipment.
(4) One, on alternate years.
(5) Two years.
(6) M. S. candidates.
(7) Prof. R. E. Trippensee.
(8) University of Massachusetts and College of Agriculture.
(9) Scholarship.

•

(1) Teaching Assistant Fellowships.
(2) Wildlife management.
(3) $1,400 per academic year.
(4) One, on alternate years.
(5) Two years.
(6) Graduate (prospective).
(7) Prof. R. E. Trippensee.
(8) University of Massachusetts and College of Agriculture.
(9) Scholarship.

Michigan College of Mining and Technology, Department of Forestry, Houghton, Michigan

(1) A. J. Dion Forest Products Scholarship in Forestry.
(2) Forestry.
(3) $250 per year.
(4) One.
(5) Four years.
(6) Applicants must be graduates in the upper ⅓ of their classes in high schools in Keweenaw, Houghton, Ontonagon, or Baraga Counties, Michigan. They must meet entrance requirements of the college and maintain satisfactory progress in their work.
(7) Dean of Students.
(8) A. J. Dion.
(9) Scholarship.
(10) The total grant has now been $3,000 to three individual students over the last three years.

Michigan State University, East Lansing, Michigan

Department of Forestry

(1) Homelite Forestry Scholarship.
(2) Forestry.
(3) $250.
(4) One.
(5) Awarded over a year.
(6) Awarded to deserving and qualified students who will complete their forestry training.
(7) Head, Department of Forestry.
(8) Homelite Corp.
(9) Scholarship and need.

•

Graduate

(1) Research Assistantships.
(2) Forest economics, forest hydrology, forest management.
(3) $1,600-$2,133.
(4) Three, one in each of above fields.
(5) Nine or twelve months.
(6) Graduate.
(7) Head, Department of Forestry.
(8) Michigan Agricultural Experiment Station.
(9) Scholarship.

•

(1) Special Graduate Research Assistantship.
(2) Maple syrup production.
(3) $1,600.
(4) One.
(5) Nine months.
(6) Graduate.
(7) Head, Department of Forestry.
(8) Michigan Agricultural Experiment Station.
(9) Scholarship.

•

(1) Teaching Assistantships.
(2) Forestry.
(3) $1,600 with B. S. degree, $1,800 with M. S. degree.
(4) Three.
(5) Nine months.
(6) Graduate, undergraduate training in forestry.
(7) Head, Department of Forestry.
(8) School for Advanced Graduate Studies.
(9) Scholarship.

Department of Forest Products

(1) Biddle Purchasing Company Scholarship.
(2) Lumber merchandising.
(3) $500.
(4) One. (An annual award).
(5) One year.
(6) Junior just before entering his senior year.
(7) William B. Lloyd, Department of Forest Products.
(8) The Biddle Purchasing Co. Recipient to be selected by Prof. Lloyd, Dr. A. J. Panshin, head of Dept. of Forest Products, and the president of Alpha Chapter of Sigma Lambda Chi, national honorary fraternity.
(9) Scholarship, leadership, and intense interest in a career in the lumber and building materials industry.

•

(1) Detroit Hoo Hoo Club Scholarship.
(2) Lumber and building materials merchandising.
(3) $500.
(4) One, annually.
(5) To be paid in equal yearly installments during the student's four-year college enrollment.
(6) Student must be enrolled in the Lumber and Building Materials Merchandising major; permanent home residency in state of Michigan; must remain in this major during four years in college; must maintain acceptable scholarship standards.
(7) William B. Lloyd, Department of Forest Products.
(8) Student to be selected by a committee consisting of the advisor of the Lumber and Building Materials Merchandising curriculum in the Department of Forest Products and the secretary or president of the Detroit Hoo Hoo Club.
(9) Scholarship and need.

•

(1) Detroit Lumbermen's Association Scholarship.
(2) Lumber merchandising.
(3) $500 each calendar year.
(4) One, annually.
(5) To be paid in equal installments during the four-year course of study.
(6) For a student in the Lumber and Building Materials Merchandising major only; permanent resident of the metropolitan Detroit area; student must remain in the Lumber and Building Materials Merchandising major throughout his college instruction.
(7) William B. Lloyd, Department of Forest Products.
(8) Advisor of the Lumber and Building Materials Merchandising curriculum and the manager or president of the Detroit Lumbermen's Assn. Funds administered by Michigan State University.
(9) ———.

•

(1) Illinois Lumber and Material Dealers Association Scholarship.
(2) Lumber merchandising.
(3) $500.
(4) One.
(5) Academic year.
(6) Student must be duly enrolled in the Lumber and Building Materials Merchandising major; must have permanent home residency in State of Illinois; must remain in this major throughout his college enrollment.
(7) Willliam B. Lloyd, Department of Forest Products.
(8) The Illinois Lumber and Material Dealers Assn., administered by MSU scholarship office.
(9) Scholarship, aptitude for lumber and building industry, initiative, participation in promoting extra-curricular activities, and need.

•

(1) Michigan Association of Home Builders Award.
(2) Residential building.
(3) $200 (given at the end of junior year).
(4) One.
(5) This is a lump sum, given annually.
(6) Awarded at end of junior year.
(7) William B. Lloyd, Department of Forest Products.
(8) Michigan Assn. of Home Builders representative and the advisor to the Residential Building curriculum.
(9) Scholarship, interest in building industry, extracurricular activities.

•

(1) Perry C. Miles Memorial Scholarship.
(2) Mobile Homes Curriculum.
(3) $500.
(4) One.
(5) During the student's four-year college enrollment.
(6) Department of Forest Products.
(7) Donald A. Hall, Department of Forest Products.
(8) George Miles, Head of Committee, Vagabond Coach Co., New Hudson, Mich.
(9) ———.

•

(1) Stone Container Corporation Scholarship.
(2) Packaging technology.
(3) $500.
(4) One.

(5) School year.
(6) To a senior at beginning of senior year.
(7) James W. Goff, Department of Forest Products.
(8) Stone Container Corp., Chicago, Ill. Funds administered by MSU scholarship office.
(9) Need, scholarship, interest in packaging technology.

•

Graduate

(1) Graduate Assistant, Teaching.
(2) Wood utilization, lumber merchandising, residential building.
(3) $1,600 with B. S. degree, $1,700 with M. S. degree.
(4) Two.
(5) Academic year.
(6) Graduate with degree in forest products or allied fields, half-time teaching required.
(7) Dr. A. J. Panshin, Head, Department of Forest Products.
(8) Michigan State University.
(9) ————.

•

(1) Graduate Research Assistantship.
(2) Wood utilization or technology, packaging, residential building.
(3) $1,400 with B. S. degree; $1,600 with M. S. degree, working for Ph. D.
(4) Two.
(5) Academic year.
(6) Graduate, with degree in forest products field.
(7) Dr. A. J. Panshin, Head, Department of Forest Products.
(8) Michigan State University.
(9) ————.

Department of Fisheries and Wildlife

(1) Research Assistantship.
(2) Fisheries.
(3) $1,600 with B. S. degree, $1,700 with M. S. degree.
(4) One.
(5) Nine months.
(6) Graduate, with undergraduate training in fisheries.
(7) Dr. P. I. Tack, Department of Fisheries and Wildlife.
(8) Michigan Agricultural Experiment Station.
(9) Scholarship.

University of Michigan, School of Natural Resources, Ann Arbor, Michigan

(1) Dunbar Furniture Company Scholarship.
(2) Wood technology.
(3) $500.
(4) One.
(5) One year.
(6) Undergraduate, including freshmen.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) Furniture Club of American Scholarship.
(2) Wood technology.
(3) $400.
(4) One.
(5) One year.
(6) Students in the School of Natural Resources.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) Grand Rapids Chair Co.—Sligh-Lowry Furniture Co.
(2) Wood technology.
(3) $500.
(4) One.
(5) One year.
(6) Students in School of Natural Resources.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) John Widdicomb Company Scholarship in Wood Technology.
(2) Wood technology.
(3) $500.
(4) One.
(5) One year.
(6) Students in School of Natural Resources.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) University Scholarships.
(2) Natural resources.
(3) Tuition fees.
(4) 8 to 10.
(5) One year.
(6) Graduate and undergraduate after at least one semester in the school.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) Women's National Farm and Garden Association, Ann Arbor Branch.
(2) Natural resources.
(3) $250.
(4) One.
(5) One year.
(6) Undergraduate, Michigan resident.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) Women's National Farm and Garden Association, Bloomfield Hills Branch.
(2) Natural resources.
(3) $350.
(4) One.
(5) One year.
(6) Undergraduate, Michigan resident.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

Graduate

(1) Macaulay Scholarship in Natural Resources.
(2) Natural resources.
(3) $700.
(4) One, biennially.
(5) One year.
(6) Master's candidates.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.

•

(1) National Association of Furniture Manufacturers Fellowship.
(2) Wood technology—furniture.
(3) $2,000.
(4) One.
(5) One year.
(6) Graduate.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship.

•

(1) Schoen-René Fellowship.
(2) Natural resources.
(3) $1,000.
(4) Two.
(5) One year.
(6) Graduate.
(7) Dean, School of Natural Resources.
(8) Faculty, School of Natural Resources.
(9) Scholarship and need.
See also University Scholarships above.

University of Minnesota, School of Forestry, St. Paul 1, Minnesota

(1) The Chapman Foundation Scholarships for Freshman Foresters.
(2) Forestry.
(3) $300.
(4) Two. Awarded annually.
(5) One year; $100 paid in each of the fall, winter, and spring quarters for each scholarship.
(6) Male high school students. Preference given to Minnesota residents.
(7) Application must be made on forms entitled, "Application for Freshman Scholarship in the College of Agriculture, Forestry, and Home Economics." These may be obtained from the high school principal and must be forwarded with any additional materials requested to the Dean, College of Agriculture, Forestry, and Home Economics, University of Minnesota, prior to June 1. Recipients will be notified early in the summer.
(8) School of Forestry. Donor: The Chapman Foundation, Chapman Chemical Co.

(9) Academic aptitude, vocational promise, personal attributes, leadership, and need. The recipients will be selected jointly by a committee and staff of the School of Forestry with approval of College Scholarship Committee.

•

(1) Henry Schmitz Student Leadership Fund.
(2) Forestry.
(3) Variable. One $100, or two $50 scholarships if there are two equally qualified students.
(4) See the foregoing.
(5) Awarded annually.
(6) Junior or senior.
(7) The School of Forestry staff selects the recipients.
(8) School of Forestry. Donors: Forestry School alumni and a special fund, The Stanley Buckman Fund, established by alumnus Stanley J. Buckman, Pres., Buckman Lab., Inc.
(9) Primarily leadership, scholarship, and activities in the College of Agriculture, Forestry, and Home Economics and in School of Forestry.

•

(1) Homelite Forestry Scholarship.
(2) Forest management.
(3) $500 per year.
(4) May be divided between two recipients of relatively equal qualifications.
(5) Awarded annually.
(6) ————.
(7) Not by application. The recipients of this scholarship are selected jointly by the Forestry School Committee and staff.
(8) Homelite Corporation through the University of Minnesota School of Forestry.
(9) Academic aptitude, vocational promise, personal attributes, leadership, and need.

•

(1) Hoo Hoo Immortals Memorial Scholarships.
(2) Wood utilization.
(3) $100 per year.
(4) One.
(5) Awarded annually.
(6) Junior.
(7) The recipient is selected by a School of Forestry faculty committee of three members, at least two of whom shall be members of the Twin Cities Hoo Hoo Club.
(8) University of Minnesota School of Forestry. Sponsor: Twin Cities Hoo Hoo Club.
(9) Character, leadership, scholarship, and need.
(10) Partially supported by Thomas Murdock Partridge fund.

•

Graduate

(1) Chapman Chemical Company.
(2) Wood preservation.
(3) $2,100.
(4) One.
(5) One year, renewable.
(6) Graduate; recipients pay regular fees, including resident tuition; all or part of research may be used in a thesis or for problem credit.
(7) Director, School of Forestry.
(8) University of Minnesota, School of Forestry.
(9) Undergraduate and graduate scholarship, intellectual capacity.
(10) Applications should be submitted by April 1.

•

(1) Charles K. Blandin Foundation Assistantship.
(2) Forest genetics.
(3) $2,124.
(4) One.
(5) Twelve months, renewable.
(6) Graduate; half-time research; recipients pay regular fees, including resident tuition.
(7) Director, School of Forestry.
(8) University of Minnesota, School of Forestry.
(9) Undergraduate and graduate scholarship, intellectual capacity.
(10) Applications should be submitted by April 1.

•

(1) Graduate Assistantships and Fellowships.
(2) Any field of work offered by school.
(3) $2,124.
(4) Variable.
(5) Twelve months.
(6) Graduate; half-time research; recipients pay regular fees, including resident tuition; all or part of research may be used in thesis or for problem credit.
(7) Director, School of Forestry.
(8) School of Forestry.
(9) Undergraduate and graduate scholarship, intellectual capacity.
(10) Applications should be submitted by April 1 but will be accepted at other times to fill vacancies.

•

(1) Kimberly-Clark Graduate Fellowship in Forestry.
(2) Forest management.
(3) $1,800.
(4) One.
(5) One year.
(6) Graduate; recipients pay resident tuition fees and such additional fees as regularly required. Based on quality of work, assistantship is renewable. All or part of research may be used in thesis or problem course credit.
(7) Director, School of Forestry.
(8) University of Minnesota School of Forestry. Donor: Kimberly-Clark Foundation.
(9) Evaluation based on undergraduate and graduate study, intellectual capacity, and promise of productive scholarship.
(10) Applications should be submitted by April 1.

•

(1) Minnesota and Ontario Paper Company Graduate Research Fellowship in Forestry.
(2) Forest management.
(3) $1,500.
(4) One.
(5) One year, renewable.
(6) Graduate; recipients pay regular fees, including resident tuition; all or part of research may be used in a thesis or for problem credit.
(7) Director, School of Forestry.
(8) University of Minnesota, School of Forestry. Donor: Minnesota and Ontario Paper Co.
(9) Undergraduate and graduate scholarship, intellectual capacity.
(10) Applications should be submitted by April 1.

•

(1) Resources for the Future Assistantships in Forest Genetics.
(2) Forest genetics.
(3) $2,124.
(4) Two.
(5) One year.
(6) Graduate; half-time research; recipients pay regular fees, including resident tuition; all or part of research may be used in a thesis or for problem credit.
(7) Director, School of Forestry.
(8) University of Minnesota, School of Forestry. Donor: Resources for the Future, Inc.
(9) Undergraduate and graduate scholarship, intellectual capacity.
(10) Applications should be submitted by April 1.

University of Missouri, School of Forestry, Columbia, Missouri

(1) Curators Scholarship.
(2) General (forestry included).
(3) Equivalent of library, hospital, and incidental fee, or $135 per year.
(4) One for each accredited high school in Missouri.
(5) One year—freshman.
(6) Resident of Missouri. Awarded to graduate of highest promise in each school.
(7) Director of Admissions, University of Missouri.
(8) Board of Curators.
(9) High school scholarship.

•

(1) Edward K. Love Scholarships.
(2) Conservation.
(3) $100.
(4) Several.
(5) One year—freshman.
(6) Limited to students with demonstrated interest in conservation.
(7) Office of Admissions, University of Missouri.
(8) Edward K. Love Foundation.
(9) Highest ranking boys or girls in in wildlife conservation programs of the 4-H Clubs of Missouri or to the highest ranking boys in the Wildlife Conservation program of the Missouri Chapters of the Future Farmers Association.

•

(1) Kroger Scholarships.
(2) Agriculture and forestry.
(3) $150.

(4) Four annually.
(5) One year.
(6) Limited to students in the College of Agriculture.
(7) Dean, College of Agriculture, University of Missouri.
(8) College of Agriculture.
(9) Need and high school record.

•

(1) Sears-Roebuck Scholarships.
(2) Agriculture and forestry.
(3) $150.
(4) 23.
(5) One year.
(6) Limited to students in College of Agriculture.
(7) Dean, College of Agriculture, University of Missouri.
(8) College of Agriculture.
(9) Need and scholastic record in high school.

Montana State University, School of Forestry, Missoula, Montana

Graduate

(1) Research Fellowship.
(2) Forest, range, or wildlife management; wood utilization.
(3) $1,200.
(4) Two.
(5) Nine months.
(6) Graduate.
(7) Dean, School of Forestry.
(8) School of Forestry.
(9) Individual's application.

•

(1) Research Fellowship.
(2) Forest, range, or wildlife management; wood utilization.
(3) $2,000.
(4) One.
(5) One year.
(6) Graduate.
(7) Dean, School of Forestry.
(8) School of Forestry.
(9) Individual's application.

•

(1) Teaching Assistantship.
(2) Forest, range, or wildlife management; wood utilization.
(3) $1,200.
(4) Two.
(5) Nine months.
(6) Graduate.
(7) Dean, School of Forestry.
(8) School of Forestry.
(9) Individual's application.

State University College of Forestry at Syracuse University, Syracuse 10, New York

(1) Allied Paper Salesmen's Association, Inc. of New York Scholarship.
(2) Pulp and paper technology.
(3) $300.
(4) One.
(5) One year.
(6) Outstanding student in the junior class.
(7) Dean of Students.
(8) College of Forestry for Allied Paper Salesmen's Association.
(9) Need.

•

(1) Boxboard Research and Development Association Scholarship.
(2) Paperboard field.
(3) $250.
(4) One.
(5) One year.
(6) Senior.
(7) Dean of Students.
(8) College of Forestry for Boxboard Research and Development Assn.
(9) Upper quarter of class, of good moral character, and indicated preference of interest in paperboard field.

•

(1) The Dixie Cup Company Scholarship.
(2) Pulp and paper technology or plastics and cellulose option.
(3) $500.
(4) One.
(5) One year.
(6) Junior.
(7) Dean of Students.
(8) College of Forestry for Dixie Cup Co.
(9) Scholarship, character, demonstration of qualities of potential leadership, and need.

•

(1) Forest Products Research Society Scholarship.
(2) Wood utilization technology.
(3) $50 to $200.
(4) Three—$200 first place; $100 second place; $50 third place.
(5) Awarded once a year.
(6) Senior.
(7) Dean of Students.
(8) College of Forestry for Forest Products Research Society.
(9) Scholarship, faculty recommendation, extracurricular activities, experience, and a paper by the candidate.

•

(1) Fred C. Boyce Student Award.
(2) Pulp and paper technology.
(3) $200.
(4) One.
(5) One year.
(6) Senior.
(7) Dean of Students.
(8) College of Forestry for American Pulp and Paper Mill Superintendents Assn.
(9) Need, scholarship, personality, and extracurricular activities.

•

(1) The Mead Corporation Scholarship.
(2) Pulp and paper technology.
(3) $250.
(4) One.
(5) One year.
(6) Junior
(7) Dean of Students.
(8) College of Forestry for the Mead Corp.
(9) A worthy student.

•

(1) National Starch Products, Inc. Scholarship.
(2) Pulp and paper technology or plastics and cellulose technology.
(3) $500 per year for four years.
(4) One (awarded in alternate years, beginning September 1954).
(5) Four years.
(6) Limited to freshmen who plan to major in pulp and paper technology or plastics and cellulose technology.
(7) Dean of Students.
(8) College of Forestry for National Starch Products, Inc.
(9) Scholarship, good character, demonstrated qualities for potential leadership in the paper field, and need.

•

(1) Oswego Falls Corporation Scholarship.
(2) Pulp and paper technology or plastics and cellulose option.
(3) $500 per year.
(4) One each four years beginning September 1956.
(5) Four years.
(6) Entering freshmen.
(7) Dean of Students.
(8) College of Forestry for the Oswego Falls Corp.
(9) Scholarship, good character, demonstrated qualities for potential leadership, and need.

•

(1) Out-of-State Tuition Scholarships.
(2) All fields.
(3) Out-of-state tuition and fees amounting to $350 per year.
(4) Eight.
(5) One year, usually.
(6) Undergraduate and gradute, limited to non-residents.
(7) Dean of Students.
(8) College of Forestry.
(9) Scholarship and need.

•

(1) Pennsylvania, New Jersey and Delaware Division of the American Pulp and Paper Mill Superintendents Association Scholarship.
(2) Pulp and paper technology.
(3) $300.
(4) One.
(5) One year.
(6) Senior.
(7) Dean of Students.
(8) College of Forestry for Pennsylvania, New Jersey and Delaware Division of the American Pulp & Paper Mill Superintendents Assn.
(9) Scholarship, personality, cooperation, qualities of leadership, and need.

•

(1) St. Regis Paper Company Scholarship.
(2) General forestry.
(3) $800 for each of two years.
(4) One student each year selected from one of four northeastern institutions.
(5) Two years.
(6) Junior.
(7) Dean of Students.
(8) College of Forestry for St. Regis Paper Co.
(9) Scholarship, character, personality, leadership, activities.

•

Graduate

(1) College Assistantships.
(2) Chemistry of wood and polymers,

pulp and paper technology, wood technology, forest products manufacture and utilization, forest administration, botany, economics, entomology, influences, management, mensuration, photogrammetry, zoology and wildlife management, silviculture, landscape architecture, and recreational management.
(3) $1,260-$1,485, also exemption from tuition and fees.
(4) 24.
(5) Nine or twelve months.
(6) Graduate; duties include a maximum of 15 hours per week teaching and doing research.
(7) Associate Dean for Graduate Studies, State University College of Forestry.
(8) State University of New York.
(9) Scholarship, service to college.
(10) Awards made in early spring, a few in late May or early June.

•

(1) College Scholarships.
(2) Chemistry of wood and polymers, pulp and paper technology, wood technology, forest products manufacture and utilization, forest administration, botany, economics, entomology, influences, management, mensuration, photogrammetry, zoology and wildlife management, silviculture, landscape architecture, and recreational management.
(3) Cover tuition and fees to amount of $350 per year.
(4) Indefinite but limited.
(5) Academic year.
(6) Graduate, mainly for foreign students.
(7) Associate Dean for Graduate Studies, State University College of Forestry at Syracuse University.
(8) State University of New York.
(9) Scholarship and need.

•

(1) Research Fellowships.
(2) Wood chemistry, polymer and plastics chemistry, pulp and paper technology, wood technology and utilization, preservation and pathology.
(3) $1,500-$2,000 plus exemption of tuition and fees.
(4) Variable.
(5) Variable, usually one year.
(6) Variable.
(7) Associate Dean for Graduate Studies, State University College of Forestry.
(8) State University of New York.
(9) Scholarship.
See also above: Out-of-State Tution Scholarships.

North Carolina State College, School of Forestry, Raleigh, North Carolina

(1) Biltmore Scholarship.
(2) Forestry.
(3) $500.
(4) One.
(5) One year.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Champion Paper and Fibre Company Scholarships.
(2) Forestry.
(3) $1,200.
(4) Three.
(5) Four years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Colin Spencer Scholarship.
(2) Forestry.
(3) $200.
(4) One.
(5) One year.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Darlington Veneer Company Scholarship.
(2) Forestry.
(3) $500.
(4) One.
(5) Two years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Gaylord Container Corporation Scholarship.
(2) Pulp and paper technology.
(3) $3,000.
(4) One.
(5) Four years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) Gaylord Container Corp.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Harry Lee Carter Scholarship.
(2) Forestry.
(3) $500.
(4) One.
(5) One year.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Homelite Scholarships.
(2) Forestry.
(3) $250.
(4) Two; one for junior, one for senior.
(5) One year.
(6) Must have highest average in junior and senior classes in forestry.
(7) ————.
(8) North Carolina State College.
(9) See (6) above.

•

(1) Pat Brown Lumber Company Scholarship.
(2) Forestry.
(3) $2,000.
(4) One.
(5) Four years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Pulp and Paper Foundation Scholarships.
(2) Pulp and paper technology.
(3) Ten at $500 per year in state; $750 per year out-of-state; five at $300 regardless of where awardee lives.
(4) 15.
(5) Renewed annually for four years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) Pulp and Paper Foundation, Inc.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Scott Russ Scholarship.
(2) Forestry.
(3) $200.
(4) One.
(5) One year.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

(1) Southeastern Division of the American Pulp and Paper Mill Superintendent Association Scholarship.
(2) Pulp and paper technology
(3) $200.
(4) One.
(5) One year.
(6) Honor junior or senior.
(7) ————.
(8) North Carolina State College.
(9) Awarded to honor junior or senior in pulp and paper technology.

•

(1) Talent for Service Scholarship.
(2) Forestry.
(3) $2,000.
(4) One.
(5) Four years.
(6) Must maintain a 2.5 average.
(7) Dean, School of Forestry.
(8) North Carolina State College.
(9) Aptitude tests, high school record, high school activities, and need.

•

Graduate

(1) R. Hoe and Company Scholarship.
(2) Forestry.
(3) $5,000.
(4) One.
(5) One year.
(6) Graduate.
(7) Dean, School of Forestry.
(8) R. Hoe and Company.
(9) Past record.
(10) To aid an extension specialist in graduate study.

Oregon State College, School of Forestry, Corvallis, Oregon

(1) Autzen Foundation Scholarship.
(2) Applies to all fields.
(3) $500.
(4) One.
(5) One school year.
(6) Outstanding student majoring in forestry at Oregon State College.
(7) Dean, School of Forestry.
(8) Autzen Foundation.
(9) Scholarship and need.

•

(1) Colonel W. B. Greeley Scholarship in Industrial Forestry.
(2) Industrial forestry.
(3) $1,000.
(4) One.
(5) Indefinite.
(6) ————.
(7) Dean, School of Forestry.
(8) Industrial Forestry Assn.
(9) Academic record, recommendations, experience.
(10) This scholarship is an outright grant. No services to the institution are required. Tuition fellowships are also provided for the recipient of this award.

•

(1) Crown Zellerbach Scholarship.
(2) Applies to all fields.
(3) $500.
(4) One.
(5) One school year (renewable).
(6) Juniors and seniors. Grade point average must be 3.00 (exceptions only on high recommendation from School of Forestry). Applicants must complete standard Oregon State System of Higher Education scholarship application form by April 1. Award to be given following school year.
(7) Dean, School of Forestry.
(8) Crown Zellerbach Foundation.
(9) Award based on high scholarship (grade point average 3.00 or better each term). Subject to continuation as major in forestry.

•

(1) Hart Scholarship.
(2) Applies to all fields.
(3) Currently $180.
(4) One.
(5) One school year.
(6) Senior in School of Forestry.
(7) Dean, School of Forestry.
(8) Floyd Hart Memorial Foundation.
(9) Primarily need, although scholarship is considered. Individual should be of high character and have sustained interest in the forestry profession.
(10) Awarded for the first time fall term 1956. Amount will in all probability increase as the total deposited with the foundation grows.

•

(1) Max D. Tucker Awards.
(2) Open to all fields.
(3) $1,000 each.
(4) Three.
(5) One school year.
(6) Open to residents of Oregon only.
(7) For Oregon State College foresters—Dean, School of Forestry. For Oregon high school seniors—Scholarship Committee, Registrar's Office, Oregon State College.
(8) Max D. Tucker Foundation.
(9) Scholarship, promise of success in forestry profession, and need.

•

(1) Sara Rehnborg Vaughn Scholarships.
(2) Open to all fields in the School of Forestry.
(3) $250.
(4) Two.
(5) One school year.
(6) No restrictions on residence or year in college.
(7) Dean, school of Forestry.
(8) Nutrilite Foundation.
(9) Need, promise of success in forestry profession, and scholarship.

•

(1) St. Regis Scholarship.
(2) Open to all fields.
(3) $800 per year.
(4) One per school year.
(5) One to two years. Subject to the awardee having continuing high scholarship during his first year after receiving award.
(6) Open to juniors only in the School of Forestry at either Oregon State College or the University of Washington. Recipient must show consistently high scholarship and worthiness to obtain second half of scholarship money during his senior year.
(7) Dean, School of Forestry.
(8) St. Regis Paper Co.
(9) Scholarship, character, promise for a successful future in forestry, and need.
(10) Awardee is offered summer employment following junior year. Awarded to University of Washington student for last two years.

•

(1) South Santiam Educational and Research Project Scholarships.
(2) Open to all fields.
(3) Approximately $500.
(4) Three.
(5) One school year.
(6) Open to sophomores, juniors, or seniors in School of Forestry. Recipient must be resident of the State of Oregon. Special emphasis placed on students who come from the Sweet Home and Lebanon, Oregon area.
(7) Dean, School of Forestry.
(8) Louis W. and Maud Hill Family Foundation.
(9) Scholarship and need.

•

Graduate

(1) Mary J. L. McDonald Fellowships.
(2) Forest management, forest engineering, forest products.
(3) $1,800.
(4) Indefinite.
(5) Indefinite.
(6) ————.
(7) Dean, School of Forestry.
(8) Mrs. Mary J. L. McDonald.
(9) Academic record, recommendations, experience.
(10) The sum indicated above reprerents annual income from an endowment fund provided by Mrs. McDonald. This fund is used to provide tuition fellowships or other fellowships for the recipients.

•

(1) South Santiam Educational and Research Project Graduate Fellowship.
(2) Forest management.
(3) $1,200 plus $200 for incidental expenses.
(4) One.
(5) Through academic year 1959-1960.
(6) Requires recipients to do research work in the field of forest management.
(7) Dean, School of Forestry.
(8) Louis W. and Maud Hill Family Foundation.
(9) Academic record, recommendations, experience.
(10) This fellowship is an outright grant. No services to the institution are required. Tuition fellowships are also provided for the recipient of this award.

•

(1) U. S. Plywood Corporation Fellowship.
(2) Industrial forestry.
(3) $1,000.
(4) One.
(5) Indefinite.
(6) None.
(7) Dean, School of Forestry.
(8) U. S. Plywood Corp.
(9) Academic record, recommendations, experience.
(10) This fellowship is an outright grant. No services to the institution are required. Tuition fellowships are also provided for the recipient of this award.

•

(1) Weyerhaeuser Fellowship.
(2) Forest management.
(3) $1,500.
(4) Two.
(5) Grants authorized through 1958.
(6) Requires recipients to do research work in field of forest management.
(7) Dean, School of Forestry.
(8) Weyerhaeuser Timber Foundation.
(9) Academic record, recommendations, experience.
(10) These fellowships are outright grants. No services to the institution are required. Tuition fellowships are also provided for the recipients of this award.

The Pennsylvania State University, School of Forestry, University Park, Pennsylvania

(1) The Glatfelter Pulp Wood Company Scholarships.
(2) Forestry or wood utilization.
(3) $500.
(4) Two.
(5) Two semesters at $250 per semester.
(6) To be awarded to one sophomore and one junior in the School of Forestry.
(7) Director, School of Forestry.
(8) The Glatfelter Pulp Wood Company.
(9) Scholarship, promise of becoming an outstanding forester, activities, and need.

(1) Homelite Forestry Scholarship.
(2) Forestry or wood utilization.
(3) Two $250 scholarships.
(4) Two.
(5) One year.
(6) Junior or senior in the School of Forestry.
(7) Director, School of Forestry.
(8) Homelite Corp.
(9) Deserving and competent student.

•

Graduate

(1) Graduate Assistantships.
(2) Forestry, wood utilization, wildlife.
(3) $156 per month.
(4) Eight.
(5) 12 months.
(6) Graduate.
(7) Director, School of Forestry.
(8) Pennsylvania State University.
(9) Scholarship.

•

(1) St. Regis Paper Company Graduate Fellowship.
(2) Forestry, wood utilization.
(3) $1,000.
(4) One.
(5) One year.
(6) Admission to accredited school of graduate study.
(7) St. Regis Paper Co., 230 Park Avenue, New York 17, N. Y.
(8) St. Regis Paper Co.
(9) Scholarship, professional activities.
(10) Given to Penn State only in those years when the successful applicant is enrolled there.

Purdue University, Department of Forestry and Conservation, Lafayette, Indiana

Graduate

(1) Graduate Assistantships.
(2) Forest production and utilization, wildlife, general conservation.
(3) $1,680 per year (includes one month vacation).
(4) Six.
(5) One or more years.
(6) Academic qualifications.
(7) Department of Forestry and Conservation.
(8) Department of Forestry and Conservation.
(9) Scholarship.
(10) Considered half-time staff.

•

(1) X-R Fellowship.
(2) Any available on campus, including forestry.
(3) Variable.
(4) Large number.
(5) Variable.
(6) ————.
(7) Graduate School.
(8) X-R Foundation Board.
(9) Scholarship.

Utah State University, College of Forest, Range, and Wildlife Management, Logan, Utah

Graduate

(1) Assistantships from private agencies.
(2) Wildlife and fisheries research.
(3) $600 to $1,800.
(4) Variable.
(5) One year, possibility of renewable.
(6) Graduate, with degree in wildlife management, zoology, forestry, range, botany, certain aspects of soil sciences.
(7) Utah Cooperative Wildlife Research Unit, Utah State University.
(8) National Wildlife Federation; Utah Wildlife Federation; Wildlife Management Institute; Utah Fish and Game Department; Utah Agricultural Experiment Station; Fish and Game Departments, other than Utah; U. S. Public Health Service; Ducks Unlimited; Webster Wildlife Foundation.
(9) ————.

•

(1) Research Assistantship.
(2) ————.
(3) $100 per month per 8½ months.
(4) One.
(5) One year, possibly two.
(6) Graduate.
(7) Prof. J. Whitney Floyd, Forest Management Dept., College of Forest, Range, and Wildlife Management.
(8) Forest Management Department.
(9) ————.

•

(1) State Fish and Game Department Assistantships (through Federal Aid program).
(2) Wildlife and fisheries research.
(3) $1,200-$1,800.
(4) Two to eight.
(5) One year, renewable.
(6) Graduate, with degree in wildlife management, zoology, forestry, range, botany, or certain aspects of soil sciences.
(7) Utah Cooperative Wildlife Research Unit, Utah State University.
(8) Utah Fish and Game Department, Utah State University, Wildlife Management Institute, U. S. Fish and Wildlife Service.
(9) ————.

•

(1) Teaching Assistantship.
(2) ————.
(3) $100 per month for 8½ months.
(4) One.
(5) One year, possibly two.
(6) Graduate.
(7) Dr. W. F. Sigler, College of Forest, Range, and Wildlife Management.
(8) Department of Wildlife.
(9) ————.

•

(1) Utah Cooperative Wildlife Research Unit Assistantships.
(2) Wildlife and fisheries research.
(3) $1,200 per year.
(4) Four to six.
(5) One year, possibility of renewal.
(6) Graduate, having taken undergraduate major in wildlife management, zoology, forestry, range, botany, certain aspects of soil sciences.
(7) Utah Cooperative Wildlife Research Unit, Utah State University.
(8) Utah Fish and Game Department; Utah State Agricultural College; Wildlife Management Institute; U. S. Fish and Wildlife Service.
(9) ————.

•

(1) Various.
(2) 1 range—game; 2 sheep nutrition; 2 cattle nutrition; 1 range seeding; 1 range—rabbit ecology; 1 desert plant ecology.
(3) $1,400 per year.
(4) Eight.
(5) One year (12 months).
(6) Graduate, B grade average.
(7) Range Dept., College of Forest, Range, and Wildlife Management.
(8) Utah State University 1; Utah Experiment Station 7.
(9) ————.

University of Washington, College of Forestry, Seattle 5, Washington

(1) Agnes Healy Anderson Research Fellowship.
(2) Unrestricted.
(3) Variable, a total of $900 per year.
(4) Unlimited.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) Mrs. Agnes H. Anderson.
(9) Scholarship.

•

(1) Biles-Coleman Scholarship.
(2) Unrestricted.
(3) $500 per year.
(4) Four.
(5) Four years.
(6) Graduate of Omak High School, must maintain certain average.
(7) Dean, College of Forestry.
(8) Biles Coleman Lumber Co., Omak, Wash.
(9) Scholarship.

•

(1) Crown Zellerbach Scholarship.
(2) Unrestricted.
(3) $500.
(4) One.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) Crown Zellerbach Foundation.
(9) Scholarship.

•

(1) Customers of Elliott Bay Lumber Company Scholarship.
(2) Forest products, logging engineering, and forest management.
(3) $500.
(4) Three.
(5) One year.
(6) Senior in indicated fields of specialization.
(7) Dean, College of Forestry.
(8) Elliott Bay Lumber Co.
(9) Scholarship.

•

(1) Homelite Corporation.
(2) Unrestricted.
(3) $500.
(4) One.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) Homelite Corp.
(9) Scholarship.

•

(1) J. H. Bloedel Forestry Research Scholarship Award.
(2) Unrestricted.

(3) Variable, a total of $1,000 per year.
(4) Not limited.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) J. H. Bloedel.
(9) Scholarship.

•

(1) Northern Commercial Company Award.
(2) Unrestricted.
(3) $500.
(4) One.
(5) One year.
(6) Junior, senior, or graduate student, preferably one who will work in Northwest, including Alaska.
(7) Dean, College of Forestry.
(8) Northern Commercial Co.
(9) Scholarship.

•

(1) Paul H. Johns, Jr., Memorial Award.
(2) Unrestricted.
(3) $200.
(4) One junior, one senior.
(5) Two years.
(6) Outstanding members of senior and junior classes.
(7) Dean, College of Forestry.
(8) Tacoma Lumbermen's Club.
(9) Scholarship.

•

(1) R. B. Merrill Forestry Research and Scholarship Award.
(2) Unrestricted.
(3) About $900.
(4) One.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) R. B. Merrill.
(9) Scholarship.

•

(1) St. Regis Paper Company Scholarship.
(2) Unrestricted.
(3) $800 per year.
(4) One.
(5) Two years.
(6) Junior from University of Washington or Oregon State College.
(7) Dean, College of Forestry.
(8) St. Regis Paper Co.
(9) Scholarship.

•

(1) Seattle Hoo Hoo Club Scholarship.
(2) Unrestricted.
(3) Variable according to number awarded, usually $125 for a freshman, $200 for a sophomore.
(4) Two, may vary.
(5) One year.
(6) Entering freshman and a sophomore from King County.
(7) Dean, College of Forestry.
(8) Seattle Hoo Hoo Club.
(9) Scholarship.

•

(1) U. M. Dickey Scholarship.
(2) Unrestricted.
(3) $1,000 per year.
(4) Two.
(5) Two years.
(6) Junior
(7) Dean, College of Forestry.
(8) Scott Paper Co.
(9) Scholarship.

(1) Washington Foresters' Alumni Association Scholarships.
(2) Unrestricted.
(3) $250.
(4) Two.
(5) One year.
(6) Entering freshmen.
(7) Dean, College of Forestry.
(8) Washington Foresters' Alumni Assn.
(9) Scholarship.

•

(1) Winkenwerder Scholarships.
(2) Unrestricted.
(3) $200 to freshman, $1,000 to graduate.
(4) Six to freshmen, one to graduate.
(5) One year.
(6) ————.
(7) Dean, College of Forestry.
(8) Mrs. Winkenwerder.
(9) Scholarship.

•

Graduate

(1) Lawrence Ottinger Forest Products Fellowship.
(2) Work in plywood, wood particle board, adhesives, and allied fields.
(3) About $1,000.
(4) One.
(5) One year.
(6) Graduate.
(7) Dean, College of Forestry.
(8) U. S. Plywood and friends of Mr. Ottinger.
(9) Scholarship.

•

(1) Weyerhaeuser Fellowships in Forest Management.
(2) Forest management.
(3) $2,000.
(4) Two.
(5) One year.
(6) Graduate.
(7) Dean, College of Forestry.
(8) Weyerhaeuser Timber Foundation.
(9) Scholarship.

See also above: Northern Commercial Company Award; Winkenwerder Scholarship.

West Virginia University, Division of Forestry, Morgantown, West Virginia

(1) Gilbert Lumber Company Scholarship in Forestry.
(2) Forest management or wood industries.
(3) $900 per year.
(4) One.
(5) Four years based on satisfactory college record.
(6) High school graduate within upper 10% of class; resident of any of W. Va. counties of Mingo, Wayne, Lincoln, Logan, Boone, McDowell, Wyoming, Raleigh, Fayette, Mercer or Summers; a citizen of the U. S.
(7) Head, Division of Forestry.
(8) Board of Governors, West Virginia University.
(9) Evaluation of applicant's citizenship, extracurricular activities, personality, aptitude for forestry (school records, recommendation and interview).
(10) This scholarship was awarded September 1956; providing the recipient's record is satisfactory, it will not be offered again until the summer of 1960.

•

(1) Kroger Company Scholarship.
(2) Agriculture and forestry.
(3) $200.
(4) Two.
(5) One year.
(6) Successful applicants must have shown leadership in school, church, F.F.A., F.H.A., 4-H club-youth activities.
(7) Head, Committee on Student Aid and Grants, College of Agriculture, Forestry and Home Economics, West Virginia University.
(8) Dean, College of Agriculture, Forestry and Home Economics.
(9) Good scholarship, leadership, recommendation, citizenship.

•

(1) Phymosia Garden Club Scholarship.
(2) Forestry and conservation.
(3) $100.
(4) One.
(5) One year.
(6) Raleigh County, West Virginia, boy preferred.
(7) Head, Committee on Student Aid and Grants, College of Agriculture, Forestry and Home Economics.
(8) Phymosia Garden Club.
(9) High school scholastic records and letters of recommendation.

•

(1) Sears-Roebuck Foundation Agricultural Scholarship (Freshmen).
(2) Agriculture and forestry.
(3) $200 per year.
(4) Ten.
(5) One year.
(6) A West Virginia boy who is living on a farm or has lived on a farm for five years since the age of ten.
(7) Head, Committee on Student Aid and Grants, College of Agriculture, Forestry and Economics.
(8) Dean, College of Agriculture, Forestry and Home Economics.
(9) Need, scholarship, citizenship, recommendation (including clergy).

•

(1) Sears-Roebuck Foundation Agricultural Scholarship (Sophomore).
(2) Agriculture and forestry.
(3) $250 per year.
(4) One.
(5) One year.
(6) A West Virginia boy who is living on a farm or has lived on a farm for five years since the age of ten.
(7) Head, Committee on Student Aid and Grants, College of Agriculture, Forestry and Home Economics.
(8) Dean, College of Agriculture, Forestry and Home Economics.
(9) Need, scholarship, citizenship, recommendation (school, club leaders, clergy).

•

(1) Mead Corporation Scholarship.
(2) Engineering and general science, including forestry.
(3) $300 per year.
(4) One.

(5) One year.
(6) Open to both boys and girls in the broad scientific field.
(7) Director of Student Affairs.
(8) West Virginia University Committee on Prizes, Scholarships and Loan Funds.
(9) High scholastic records and letters of recommendation.

•

(1) Standard Oil Company of N. J. Scholarship.
(2) Broad field of Agriculture, including forestry.
(3) $200 per year.
(4) One each year.
(5) Four years.
(6) Member of a 4-H club.
(7) Head, Committee on Student Aid and Grants, College of Agriculture, Forestry and Home Economics.
(8) Dean, College of Agriculture, Forestry and Home Economics.
(9) High school records, 4-H club recommendation, need, character, and ability.

Yale University, School of Forestry, New Haven, Connecticut

Graduate

(1) Charles Boughton Wood Scholarships or Fellowships.
(2) Unrestricted.
(3) Scholarships, $500-$600; fellowships, $700-$1,400.
(4) One or two scholarships or fellowships.
(5) One academic year.
(6) None.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

•

(1) Charles W. Goodyear Scholarships.
(2) Unrestricted.
(3) $500-$650.
(4) One.
(5) One academic year.
(6) None.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

•

(1) Weyerhaeuser Timber Foundation, Charles S. Chapman Memorial Fellowships.
(2) Industrial forestry.
(3) $850 to $1,650.
(4) Four to six.
(5) One academic year.
(6) Graduate.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, demonstrated or potential professional competence.

•

(1) Crown Zellerbach Foundation Fellowship.
(2) Unrestricted.
(3) $1,200.
(4) One.
(5) One academic year.
(6) Preference to graduate of college or university in Oregon or Washington.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

•

(1) John A. Hartford Fellowships in Forest Biology.
(2) Forest biology.
(3) $750 to $3,000.
(4) Variable according to size of awards, two to six.
(5) One academic year.
(6) Ph.D. candidate, interest in research into the biological foundations of forestry.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, aptitude for research at the doctorate level.

•

(1) Research Assistantships in Wood Technology.
(2) Wood technology.
(3) $1,250 to $1,500 per academic year.
(4) Five to seven.
(5) One academic year.
(6) Graduate, wood technology, half-time work on research projects.
(7) Dean, Yale School of Forestry.
(8) School of Forestry.
(9) Scholarship, aptitude for research in wood technology.

•

(1) Scott Paper Company Foundation, Gilbert Kinney Fellowship.
(2) Industrial forestry.
(3) $1,000 per year.
(4) One.
(5) Two academic years.
(6) M.F. candidates in two-year course.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

•

(1) Starling W. Childs Memorial Scholarships or Fellowship.
(2) Unrestricted.
(3) Scholarships, $500-$600; fellowship, $1,000-$1,200.
(4) Two scholarships or one fellowship.
(5) One academic year.
(6) None.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

•

(1) Union Bag-Camp Paper Corporation Fellowship.
(2) Related to industrial forestry.
(3) $2,000.
(4) One.
(5) One academic year.
(6) Graduate, resident of Florida, Georgia, South Carolina, North Carolina, Virginia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, or Texas.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, demonstrated or potential professional competence.

•

(1) University Scholarship or Fellowship.
(2) Forestry.
(3) $600 or $1,000.
(4) Variable, possibly one at each value.
(5) One academic year.
(6) Ph.D. candidate.
(7) Dean, Yale Graduate School.
(8) Yale Graduate School.
(9) Scholarship, favorable scores on Graduate Record Examination, aptitude for research at the doctorate level.

•

(1) William Henry Sage Scholarships or Fellowships.
(2) Unrestricted.
(3) Scholarships, $500-$600; fellowship of $700-$1,400.
(4) One or two scholarships or fellowships.
(5) One academic year.
(6) None.
(7) Dean, Yale School of Forestry.
(8) Yale School of Forestry.
(9) Scholarship, potential professional competence.

Institutions Not Accredited

Stephen F. Austin State College, Department of Forestry, Nacogdoches, Texas

(1) Commercial National Bank Scholarship.
(2) Forest management.
(3) $150.
(4) One.
(5) Indefinite.
(6) Intended primarily for entering freshmen.
(7) Head, Department of Forestry.
(8) Department of Forestry.
(9) Scholastic aptitude, vocational promise, need, and leadership.
(10) Selection is made upon high school transcript, recommendations, and interview, if possible.

•

(1) Lacy Hunt Scholarship.
(2) Forest management.
(3) $150.
(4) Two
(5) Indefinite.
(6) Intended primarily for upperclassmen.
(7) Head, Department of Forestry.
(8) Department of Forestry.
(9) Academic aptitude, vocational promise, character, need, and leadership.

•

(1) Stone Fort National Bank Scholarship.
(2) Forest management.
(3) $150.
(4) One.
(5) Indefinite.
(6) Intended primarily for entering freshmen.
(7) Head, Department of Forestry.
(8) Department of Forestry.
(9) Scholastic aptitude, vocational promise, need, and leadership.
(10) Selection is made upon high school transcript, recommendations, and interview, if possible.

Harvard University, Harvard Forest, Petersham, Massachusetts

Graduate

(1) Bliss Scholarship.
(2) Forestry or sciences directly subservient to forestry.
(3) Usually tuition (currently $1,010).
(4) One.
(5) Fifteen months.
(6) Beginning graduate students, usually in Department of Biology.
(7) Graduate School of Arts and Sciences, 24 Quincy Street, Cambridge 28, Mass.
(8) Committee on Fellowships and Other Aids, Graduate School, upon recommendation of Harvard Forest staff.
(9) Scholarship and need.

Mississippi State College, Department of Forestry, State College, Mississippi

(1) Boys Conservation School Forestry Scholarship.
(2) General forestry.
(3) $125 per year.
(4) One.
(5) One academic year.
(6) Awarded to winner of competition among high school seniors attending Boys Conservation School sponsored by Mississippi Forestry Association.
(7) Director, School of Forestry.
(8) Mississippi State College.
(9) Scholarship, leadership, and need.

•

(1) East Mississippi Motor Company Forestry Scholarship.
(2) General forestry.
(3) $125 per year.
(4) One.
(5) One academic year (sometimes renewable for a second year).
(6) Limited to residents of Oktibbeha County.
(7) Director, School of Forestry.
(8) Mississippi State College.
(9) Scholarship, leadership, and need.

•

(1) G. M. & O. Railroad 4-H Forestry Scholarship.
(2) General forestry.
(3) $250 per year.
(4) One.
(5) One academic year.
(6) Awarded by a committee of the railroad and the Extension Service to the operator of an outstanding 4-H Club forestry project in a county served by the railroad.
(7) Director, School of Forestry.
(8) Mississippi State College.
(9) Scholarship, leadership, and need.

•

(1) Industrial Scholarships.
(2) General forestry.
(3) $250 per year.
(4) Six.
(5) One academic year (sometimes renewable for a second year).
(6) Generally awarded only to freshmen. Sometimes re-awarded in the sophomore year if a "C plus" average has been attained. Awards and re-awards made only with the doners' concurrence.
(7) Director, School of Forestry.
(8) Mississippi State College.
(9) Scholarship, leadership, and need.
(10) Donated by Forestry Suppliers, Inc.; Hood Manufacturing Co.; J. F. Rollins; Johns-Manville Corp.; Masonite Corp.; and Richton Tie and Timber Co.

•

(1) Regional Scholarships.
(2) General forestry.
(3) $250 per year.
(4) Nine.
(5) One academic year (sometimes renewable for a second year).
(6) Generally awarded only to a freshman. Sometimes re-awarded in the sophomore year if a "C plus" average has been attained. Awards and re-awards made only with the donors' concurrence. Geographical limitations (see No. 10).
(7) Director, School of Forestry.
(8) Mississippi State College.
(9) Scholarship, leadership, and need.
(10) Donors and geographical limitations for each of the scholarships are:
A. DeWeese Lumber Co., to persons living near the DeWeese Company lands;
Central Fire Control Assn., to residents of the territory served by the Association;
Corinth Machinery Co., to residents of northeast Mississippi;
Gaylord Container Corp., to residents of Copiah, Hancock, Harrison, Jeff Davis, Lawrence, Lincoln, Marion, Pearl River, and Simpson counties;
H. G. Carpenter, to residents of the Mississippi Delta;
Hancock Bank of Bay St. Louis, Miss., to residents of Hancock, Harrison, Jackson, Pearl River, and Stone counties;
L. N. Dantzler Lumber Co., to residents of Stone, Harrison, George, and Jackson counties;
Poplarville Bank of Commerce of Poplarville, Miss., to residents of Pearl River county;
Consumers Wirebound Box Co.; Gatlin Lumber Co.; J. C. Martin Lumber Co.; to residents of Wayne County.

University of New Hampshire, Department of Forestry, Durham, New Hampshire

(1) Conant Scholarship.
(2) Forestry or wildlife management.
(3) $100-$125.
(4) Several.
(5) One year, renewable.
(6) ————.
(7) Dean of Students.
(8) University committee.
(9) Financial need.
(10) Application forms in all New Hampshire high schools.

•

(1) Granite State Hoo Hoo Club Scholarship.
(2) Forestry.
(3) $100.
(4) Two.
(5) One year.
(6) ————.
(7) Dean of Agriculture or Forestry Department.
(8) Forestry Department.
(9) Financial need, scholarship.
(10) To interest students in retailing of wood products.

•

(1) Rockingham County Forest Fire Wardens Association Scholarship.
(2) Forestry or widlife management.
(3) $100.
(4) One.
(5) One year.
(6) Student must be from Rockingham County, N. H.
(7) Dean of Agriculture or Forestry Department.
(8) Forestry Department.
(9) Financial need.

•

(1) Sears-Roebuck Foundation Scholarship.
(2) Forestry or wildlife management.
(3) $150.
(4) Several.
(5) Freshmen only.
(6) Farm background.
(7) Dean of Agriculture.
(8) Dean of Agriculture.
(9) Financial need.

•

(1) University Scholarship.
(2) Forestry or wildlife management.
(3) $100-$200.
(4) Several.
(5) One year basis. Renewable.
(6) Upperclassmen.
(7) Dean of Students.
(8) University committee.
(9) Financial need.

•

(1) Tuition Grants.
(2) Forestry or wildlife management.
(3) $100-$200.
(4) Several.
(5) One year.
(6) Freshmen.
(7) Dean of Students.
(8) University committee.
(9) Financial need.

The University of the South, Forestry Department, Sewannee, Tennessee

(1) Forestry Scholarships.
(2) Forest management.
(3) $500.
(4) Five.
(5) One year
(6) Pass College Entrance Board examinations.
(7) Director of Admissions.
(8) University of the South.
(9) General excellence in scholarship.

State College of Washington, Department of Forestry and Range Management, Pullman, Washington

(1) Various.
(2) General (forestry included).
(3) $32,000 (total).
(4) Several hundred.
(5) One semester (mostly).
(6) Entering freshmen from Washington state high schools.

(7) List available at W.S.C. and at most high schools.
(8) Various, including W.S.C.
(9) Scholarship, need.
(10) These scholarships cover a wide field; many available to forestry students. Some as Potlatch Forest Foundation, Inc. ($250-$600 each) renewable each year.

•

(1) Various.
(2) General (forestry included).
(3) $20-$250.
(4) Several hundred.
(5) One semester (some renewable).
(6) Available to students at W.S.C. with high scholarship ratings.
(7) Chairman—Scholarship Standards Committee, W.S.C.
(8) Same.
(9) Scholarship, need, character, activities.
(10) Forestry students may receive some of 130 scholarships at W.S.C. Some renewable; some scholarships have different awards.

Canadian Institutions

University of British Columbia, Faculty of Forestry, Vancouver, British Columbia, Canada

(1) Alaska Pine Co. Ltd. Scholarship.
(2) Forestry or forest engineering.
(3) $500.
(4) One.
(5) One year.
(6) Fourth year; must have completed third year in curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Canadian Forest Products Ltd. Scholarship.
(2) Forestry or forest engineering.
(3) $150.
(4) Two.
(5) One year.
(6) Fourth year; must have completed third year in curriculum at University of British Columia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Canadian Forestry Association Scholarship.
(2) Forestry, forest engineering.
(3) $200.
(4) One.
(5) One year.
(6) First year, must have completed one year in Arts & Science curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Finning Tractor & Equipment Ltd. Scholarship.
(2) Forestry or forest engineering.
(3) $250.
(4) Two.
(5) One year.
(6) Third or fourth year; must have completed one year in curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Galt Elkington Scholarship.
(2) Forestry or forest engineering.
(3) $300.
(4) One.
(5) One year.
(6) Fourth year; must have completed third year in curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) H. R. MacMillan Scholarship.
(2) Forestry or forest engineering.
(3) $100-$200.
(4) One at each value.
(5) One year.
(6) Second or third year; must have completed one year in the curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) MacMillan & Bloedel Ltd. Scholarship.
(2) Forestry or forest engineering.
(3) $400.
(4) Three.
(5) One year.
(6) First year, must have completed one year in Arts & Science curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Phil Wilson Bursary.
(2) Forestry or forest engineering.
(3) $300.
(4) One.
(5) One year.
(6) Fourth year; must have completed third year in curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Timber Management Ltd. Award.
(2) Forestry or forest engineering.
(3) $250.
(4) One.
(5) Two years.
(6) Third year; must have completed one year in the curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Truck Loggers Association Scholarship.
(2) Forestry or forest management.
(3) $125.
(4) Two.
(5) One year.
(6) First year; must have completed one year in Arts & Science curriculum at University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Western Plywood Bursary.
(2) Forestry or Forest engineering.
(3) $125.
(4) Two.
(5) One year.
(6) Third or fourth year; must have completed one year in curriculum at the University of British Columbia.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

■

Graduate

(1) Canadian Pulp and Paper Association (Western Division) Fellowship.
(2) Forestry.
(3) $500.
(4) Two.
(5) ————.
(6) Graduate; must be resident of British Columbia; tenable at British Columbia or elsewhere.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Graduate Research and Teaching Assistantships.
(2) Forestry.
(3) $500-$1,000.
(4) Several.
(5) ————.
(6) Graduate.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Leon J. Koerner Graduate Fellowship in Forest History.
(2) Forest history.
(3) $1,000.
(4) One.
(5) ————.
(6) Graduate.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

•

(1) Pacific Pine Co. Ltd. Scholarship in Forest Products and Wood Technology.
(2) Forest products, wood technology.
(3) $300.
(4) One.
(5) ————.
(6) Graduate.
(7) Faculty of Forestry.
(8) ————.
(9) ————.

University of New Brunswick, Faculty of Forestry, Fredericton, New Brunswick, Canada

(1) Harold Crabtree Memorial Scholarship.
(2) Forestry.
(3) $1,000-$500 the first year; $300 the second; and $200 third year.
(4) One annually.
(5) ————.
(6) Awarded to the student enrolling in forestry course who has a high entrance standing and at the same

time needs some assistance to finance his university work. If no student of sufficiently high standing applies in the Faculty of Forestry, the awarding agency may make the award to a student in any other faculty of the University.
(7) The President, University of New Brunswick.
(8) Scholarship Committee of the University for Fraser Companies, Ltd.
(9) High entrance standing and need.

•

(1) Osmose Wood Preserving Co. of Canada Scholarship (Undergraduate).
(2) Forestry.
(3) $250.
(4) One annually.
(5) ————.
(6) It will be awarded to a student in forestry who is working in the general field of wood technology, wood utilization, and wood preservation.
(7) Faculty of Forestry, University of New Brunswick.
(8) Faculty of Forestry Selection Committee for Osmose Wood Preserving Co. of Canada.
(9) Best thesis submitted on wood preservation.

•

(1) Price Brothers Scholarships.
(2) Forestry.
(3) $500 each annually.
(4) Two annually.
(5) Five years.
(6) $500 each for a student in the fourth year and a student in the fifth year, where these students are sons of employees of Price Brothers with best scholastic attainment; failing the presence of employees sons, $250 each to other students in the fourth and fifth years.
(7) Faculty of Forestry Selection Committee
(8) Selection Committee Faculty of Forestry for Price Brothers & Co.
(9) Scholastic standing and need.

•

(1) Richard Bedford Viscount Bennett.
(2) Forestry.
(3) $125.
(4) Two annually.
(5) ————.
(6) Awarded under a resolution of the University Senate, one to a student entering the third year and one to a student entering the fourth year.
(7) Faculty of Forestry, University of New Brunswick.
(8) Faculty of Forestry Selection Committee.
(9) High scholastic standing.

•

Graduate

(1) Anglo-Canadian Pulp and Paper Company, Ltd. and Gaspesia Sulphite Company, Ltd. Graduate Scholarships.
(2) Logging.
(3) $500.
(4) One.
(5) ————.
(6) Graduate.
(7) Faculty of Forestry Selection Committee.
(8) Faculty of Forestry Selection Committee for awarding companies.
(9) Scholarship.

•

(1) Beaverbrook United Kingdom Scholarships.
(2) Forestry.
(3) $1,500 per year.
(4) Four.
(5) ————.
(6) Post-graduate, students from United Kingdom
(7) Mrs. Sheila Elton, M. A., 121/8 Fleet St., London, E. C. 4, England.
(8) Lord Beaverbrook.
(9) Scholarship.

•

(1) National Research Council of Canada Postgraduate Scholarships (Bursaries and Studentships).
(2) Forestry.
(3) Bursaries, $800, studentships $1,200.
(4) Limited.
(5) One academic year; studentships may be renewed twice, bursaries not renewable.
(6) Bursaries awarded to students with no previous research experience; studentships to students with at least one year's experience after graduation to assist in research.
(7) Awards Officer, National Research Council, Ottawa, Ontaria.
(8) Faculty of Forestry Selection Committee.
(9) Scholarship and need.
(10) May be supplemented by additional $800 for summer preceding and $800 for summer following the academic term in which award is held; recommendation of research supervisor required.

•

(1) National Research Council Post-Doctorate Fellowships.
(2) Forestry.
(3) $3,700 for single man; $4,500 for married man, allowance of 2/3 this grant paid to a married Fellow when accompanied by his wife.
(4) Limited.
(5) ————.
(6) Have Ph. D. from recognized university or expect to obtain one before taking up an award; not more than 35 years of age; meet Canadian immigration requirements.
(7) Awards Officer, National Research Council, Ottawa.
(8) National Research Council.
(9) ————.

University of Toronto, Faculty of Forestry, Toronto, Ontario, Canada

(1) F. K. Morrow Forestry Scholarship.
(2) Undergraduate course in Faculty of Forestry.
(3) $250.
(4) One.
(5) One year.
(6) Awarded to the student who ranks highest with honors at the annual examinations of the third year.
(7) No application required.
(8) Senate of University of Toronto.
(9) ————.

•

(1) Forestry Memorial Scholarships.
(2) Four-year undergraduate course in Faculty of Forestry.
(3) $250 each.
(4) Two.
(5) One year.
(6) Awards made primarily on the basis of marks obtained at the Ontario Grade XIII examination, but physical fitness and financial requirements will also be taken into consideration. There will be no award of these scholarships made in any session in which no candidate obtains an average of at least sixty-six percent in the nine papers prescribed for admission to the first year in Faculty of Forestry.
(7) Application for these scholarships is not required. The application forms submitted for admission to the University will be used by the committee when awarding the scholarships.
(8) Senate of University of Toronto.
(9) ————.

•

(1) John Lewis Foster Scholarship.
(2) Four-year undergraduate course in Faculty of Forestry.
(3) $250 each.
(4) One.
(5) One year.
(6) Awarded to a student who has completed the academic requirements for admission to the Faculty of Forestry after at least two years' attendance in a secondary school in one of the following counties: Hastings, Peterborough, Frontenac, Lennox-Addington.
Note: Above counties are in the Province of Ontario, Canada.
(7) Application for this scholarship should be made to the Registrar of the University of Toronto on or before May 1st on a form to be obtained from the Registrar.
(8) Senate of University of Toronto.
(9) The basis of award will be primarily the marks obtained at the Grade XIII examination, but physical fitness and financial requirements will also be taken into consideration.

•

(1) Osmose Wood Preserving Scholarship.
(2) ————.
(3) $250.
(4) One.
(5) One year.
(6) ————.
(7) No application required.
(8) Senate of University of Toronto.
(9) The scholarship will be awarded to a student of the fourth year who has obtained the highest average during the last two years of his course in the following three

subjects:
wood structure and technology (third year);
forest utilization (fourth year);
cellulose industries (fourth year).

•

(1) Spruce Falls Power and Paper Company, Ltd., Scholarships—Cola G. Parker Scholarships.
(2) Undergraduate course in Faculty of Forestry.
(3) $250.
(4) Two.
(5) One year.
(6) ————.
(7) No application required.
(8) Senate of University of Toronto.
(9) To be awarded to two students on the results of final examinations of third year, one to the student obtaining the highest average in a group of three or four selected subjects in the biological field, and one to the student obtaining the highest average in a group of three or four selected subjects in the mathematical field.

•

(1) Spruce Falls Power and Paper Company, Ltd., Scholarships—Robert W. Lyons Scholarships.
(2) Undergraduate course in Faculty of Forestry.
(3) $250.
(4) Two.
(5) One year.
(6) ————.
(7) No application required.
(8) Senate of University of Toronto.
(9) To be awarded to two students on the results of the final examinations of the second year, one to the student obtaining the highest average in a group of three or four selected subjects in the biological field, and one to the student obtaining the highest average in a group of selected subjects in the mathematical field.

•

(1) White Pine Bureau Scholarship.
(2) Undergraduate course in Faculty of Forestry.
(3) $100.
(4) One.
(5) One year.
(6) Awarded to the student who ranks highest with honors at the annual examinations of the first year.
(7) No application required.
(8) Senate of University of Toronto.
(9) ————.

•

Graduate

(1) Canadian Lumbermen's Association Timber Research Fellowship.
(2) Research in timber engineering.
(3) $1,250 per year.
(4) One.
(5) Duration of the program (probably two years).
(6) Graduate, prescribed program of study and research in engineering and forestry.
(7) Secretary, School of Graduate Studies, Senate of University of Toronto.
(8) Senate, University of Toronto.
(9) ————.

•

(1) Fellowship in forest economics.
(2) Research in economics.
(3) $1,800.
(4) Two.
(5) One year, 12 month basis.
(6) Degree in forestry from any recognized university.
(7) Secretary, Faculty of Forestry, University of Toronto.
(8) Council, Faculty of Forestry.
(9) ————.

SECTION BOX SCORE 1957 MEMBERSHIP

Section	Applications received[1] Sept. 1957	Total 1956	Total 1957
Allegheny	1	58	63
Appalachian	3	58	23
Central Rocky Mountain	0	32	21
Central States	0	42	11
Columbia River	0	77	53
Gulf States	1	79	42
Inland Empire	1	32	15
Intermountain	0	35	5
Kentucky-Tennessee	0	12	6
New England	1	61	38
New York	1	45	35
Northern California	1	67	18
Northern Rocky Mountain	1	31	47
Ozark	2	19	59
Puget Sound	2	44	48
Southeastern	2	92	102
Southern California	1	2	3
Southwestern	1	2	6
Upper Mississippi Valley	0	72	49
Washington	0	1	10
Wisconsin-Michigan	2	102	32
Totals	20	963	686

[1]Students, Junior, Affiliate, Associate (Initial) grades only.

SCHOOL BOX SCORE 1957 MEMBERSHIP

School	Student applications received Sept. 1957	Total 1956	Total 1957
Alabama Polytechnic Institute	0	6	19
University of California	0	53	10
Colorado State University	0	28	16
Duke University	1	7	4
University of Florida	0	25	5
University of Georgia	0	30	59
University of Idaho	1	21	15
Iowa State College	0	31	18
Louisiana Polytechnic Institute	0	27	1
Louisiana State University	0	22	19
University of Maine	0	13	18
University of Massachusetts	0	20	2
Michigan State University	0	50	9
University of Michigan	0	24	9
University of Minnesota	0	26	27
University of Missouri	0	2	36
Montana State University	1	17	45
State University of New York	0	38	24
North Carolina State College	0	24	1
Oregon State College	0	44	29
Pennsylvania State University	0	35	29
Purdue University	0	36	2
Utah State University	0	28	5
University of Washington	0	21	16
West Virginia University	0	5	19
Yale University	0	13	5
Totals	3	646	442

Some Effects of Temporary Flooding on Coniferous Trees[1]

Clifford E. Ahlgren and Henry L. Hansen
Respectively, Quetico-Superior Wilderness Research Center, Ely, Minnesota, and School of Forestry, University of Minnesota, St. Paul

THE EFFECTS OF submergence by water on forest growth are of considerable biological significance and are also important in connection with a number of practical land management problems. Flooding as an ecological factor undoubtedly plays a role in determining the species involved in certain types of forest succession. Foresters are concerned with flooding as a factor causing mortality of trees and with excessive water as an important factor affecting site quality. The legal resolution of flood damage claims and the establishment of riparian boundaries are dependent in large measure on knowledge of the effects of flooding on vegetation.

The direct cause of growth retardation and mortality of flooded trees is not known. It may lie in the altered soil carbon dioxide-oxygen ratio, or in the decrease in available nitrates in the root environment. On smaller trees, one contributing factor may be a decreased crown surface and the resultant reduction of photosynthetic area.

Although some flood tolerance studies have been conducted on bottomland hardwood species (*3*, *4*), little information is available for upland species, particularly the conifers. The present study is an effort to add to the information on this latter aspect of flooding problems. The effect of different periods of flooding on the terminal growth, crown recovery, and survival of native conifers was observed during 1950 and 1951 in two northern Minnesota areas. Data on flood mortality in these areas was completed in 1952. General observations were also made at two other flooded areas during 1950 and 1952. In all cases, the flooding occurred in the spring of 1950, before growth began. However, flood conditions and duration varied among the areas as described below.

Areas Studied

Basswood Lake.—Flooding was the result of early fall ground freeze, deep snowfall, and rapid spring thaw. The flooding began with the spring thaw in May and continued until the latter part of June. The trees studied were inundated for up to 48 days and were standing in at least 4 feet of water. The area studied is located on the forest plantation of the Quetico-Superior Wilderness Research Center (*1*) which covers 160 acres along a ⅝ mile shoreline on Basswood Lake. The study area sloped toward the lake at about 15° and included a strip 1 chain wide and ¼ mile long starting at the water's edge and parallel to the shore of a bay. Trees studied include both natural and planted conifers.

Babbit.—At the same time as the Basswood Lake flood, similar conditions initiated a flood of a 586 acre forest plantation in the Superior National Forest, 20 miles southeast of Ely, Minnesota. The flooded area, covering about 2½ acres, is situated in a shallow basin on a low upland ridge and is bordered by jack pine and quaking aspen. The impounded water stood in the basin to an average depth of 3 feet from spring until the middle of September. Since jack pine was not available in the flooded area at Basswood Lake, the measurements and observations on this species were obtained here. It must be noted, however, that the duration and depth of flood differed in the two areas, in addition to probable differences in micro-climatic conditions not measured. In this area, the study was conducted on a transect 1 chain wide and 20 chains long, extending through the middle of the flood area.

In addition to these two areas, where detailed records were kept, general observations were made at Squaw Lake in Itasca State Park, where in late May 1950, caved in road banks caused the plugging of a flowage outlet. As a result, the water level rose 8 feet above normal, innundating land adjacent to the shoreline in a belt 1 to 2 chains wide surrounding the entire lake. The area was flooded for three months. Several transects 1 chain wide and 2 chains long at right angles to the shore were established, from which information on both hardwoods and conifers was obtained. General observations were also made at Rainy Lake, Ranier, Minnesota, where the flood stage reached its peak on June 1, 1950, and land adjacent to the shoreline remained flooded for three months. Both hardwoods and conifers were observed here.

Methods

At Basswood Lake, measurements of terminal shoot growth and percent of flooded crown living were made on white spruce, black spruce, red pine, white pine, and balsam fir. In the field, trees were recorded in three size classes—1-2 feet, 3-4 feet, and 5-12 feet—for the different periods of submergence as noted in Figure 1. A water level gauge at the Quetico-Superior Wilderness Research Center made it possible to determine the period of submergence for each tagged tree. Preflood growth for 1948 and 1949 was recorded as well as growth for the flood year (1950) and the first post-flood year (1951). At Babbit, flooded for 123 days, the same measurements were made on 5-12 foot jack pine, the only

[1]This study was submitted by the senior author as a thesis to the Graduate School of the University of Minnesota, in partial fulfillment of the requirements for the degree, Master of Science. Work on this project was made possible by use of facilities and general support of the Quetico-Superior Wilderness Research Center.

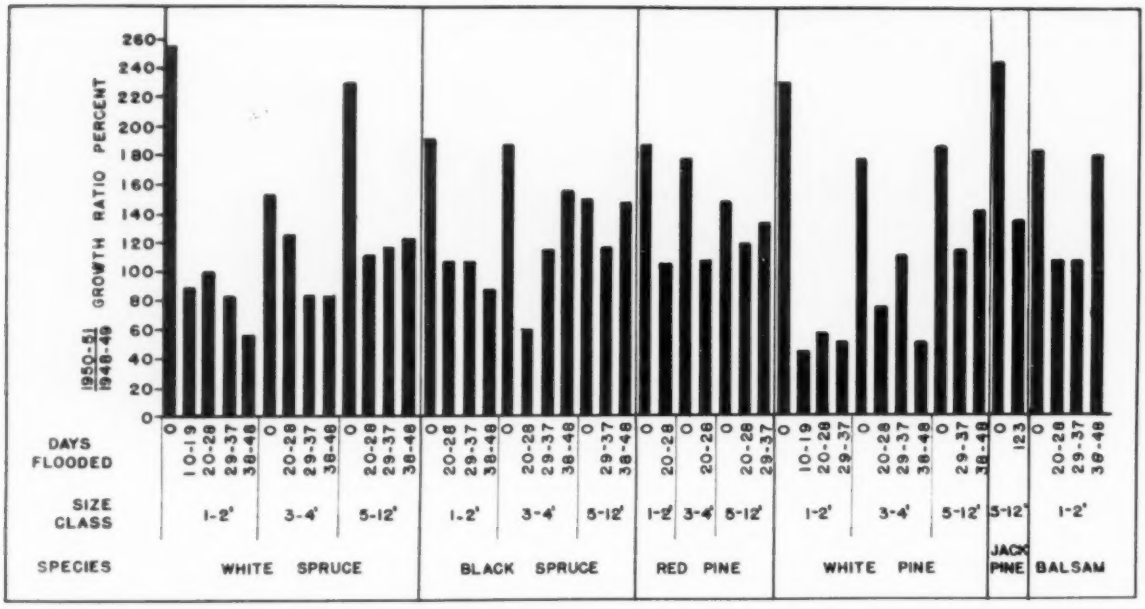

FIG. 1.—A comparison of terminal height growth of flooded and nonflooded trees.

size class available. The 1948 preflood terminal shoot growth was not obtained on this species, so measurements of only 1 pre-flood year (1949) were used in the comparisons. At Babbit, Squaw Lake, and Rainy Lake the period of submergence was arbitrarily set as the total time of impoundment. Because of the different periods of flooding and the different numbers of trees within the various size classes, the data were grouped in the categories shown in Figures 1 and 2.

Results

Terminal growth.—In order to determine the relationship between the preflood terminal shoot growth and the post-flood growth, the average 1950 and 1951 (post-flood) growth was compared with the average 1948 and 1949 (preflood) growth in the ratio, $\frac{\text{growth 1950-1951}}{\text{growth 1948-1949}}$ for each species, size-class, and period of submergence. As controls, similar ratios were determined for nonflooded trees. For jack pine only one year (1949) preflood growth was available for the ratio. The results are summarized in Figure 1.

It is apparent that the rate of growth of the terminals is noticeably reduced by flooding. This was generally true for all species, size-classes, and flood periods, except for the 5-12 foot black spruce flooded for 38-48 days and for 1-2 foot balsam fir flooded for 38-48 days. It is felt that in these latter instances the size of the sample is inadequate (Table 1), as a definite growth reduction was found for trees flooded for shorter periods of time.

The reduction in terminal growth was generally more serious in the 1-2 foot size-class than it was for the larger sizes. This was true for white spruce, black spruce, red pine, and white pine. For jack pine and balsam fir, only one size-class was represented in the sampling and no information on the influence of size could be obtained.

There did not appear to be any uniformity in the effect of length of submergence period on subsequent terminal growth. Trees flooded for less than 28 days in many cases showed as serious growth reduction as trees flooded for longer periods. However, since even the shorter periods of flood occurred during the first half of the summer, the critical period for height growth, possibly this accounts for the seriousness of the flooding periods of less than four weeks.

Crown recovery.—The extent to which the crown recovers following flooding is important in the survival, subsequent growth, and form of the trees. Using the same trees studied for terminal growth, an ocular estimate was made on each tree of the percent of submerged crown recovery in 1950 and 1951. The estimates for 1950 for white spruce and white and red pine represent replacement foliage or new growth formed following flood recession. These species lost all of the original foliage during the flood year. For black spruce and balsam fir, the estimate represents survival foliage plus new growth during the post-flood year. The results are summarized in Figure 2.

The percent of recovery of 1-2 foot and 3-4 foot white spruce and white pine dropped sharply as the period of submergence increased. In contrast to this, balsam fir and black spruce crowns showed a remarkable ability to endure and recover from extended periods of flooding. In the case of white spruce, red pine, and white pine, foliage of the larger trees seemed

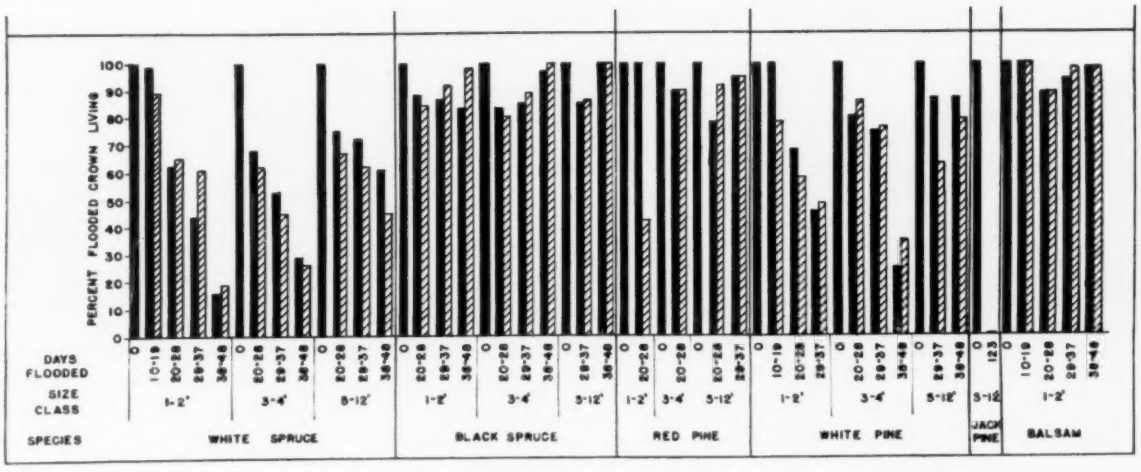

FIG. 2.—Crown recovery for the flood year and the first post-flood year. The solid bar represents the flood year recovery; the cross hatched bar represents the first post-flood year recovery.

to recover better than did the foliage of the smaller trees.

Tree survival.—The percent survival by size-class and period of submergence was determined for the same categories used in the studies of terminal growth and crown recovery. Death of flooded trees was not evident until the summer of 1952. Survival tallies were made at the end of that season, while final observations on terminal growth and crown recovery were completed in mid-summer of the same year. All death was assumed to be directly or indirectly caused by flooding.

All species and size-classes had at least 90 percent survival when flooded for 28 days or less. The 5-12 foot class for all species showed better than 90 percent survival for all periods of flooding up to 48 days. Among the smaller size-classes, balsam fir and black spruce both showed close to 100 percent survival for all periods of flooding up to 48 days. It is shown in Figures 1 and 2 that these two species also showed a high percent of crown recovery and that balsam fir showed less reduction in terminal growth due to flooding. On the other hand, white pine and white spruce showed a marked decrease in survival for the longest period of flooding. The 3-4 foot white pine showed up to 25 percent mortality for the 38-48 day flood period. The 1-2 foot white spruce were affected after 29 days of flooding. These results correlate fairly well with the results obtained in the observations on terminal growth and crown recovery.

The data presented above were obtained in areas where the period of flooding was 48 days or less. Considerably greater mortality was obtained in regions where the flood period was 60 days or more. At Babbit (flooded 123 days) high mortality occurred in all size classes of balsam fir. Mortality was also observed among the few white and black spruce found in the area.

TABLE 1.—SIZE OF SAMPLE FOR EACH SPECIES, SIZE CLASS, AND PERIOD OF FLOODING

Species	Size-class	Days flooded	No. trees	Species	Size-class	Days flooded	No. trees
	Ft.				*Ft.*		
White Spruce	1-2	0	34	White Pine	1-2	0	50
		10-19	7			10-19	15
		20-28	16			20-28	53
		29-37	64			29-37	8
		38-48	6			38-48	—
	3-4	0	20		3-4	0	20
		10-19	—			10-19	—
		20-28	17			20-28	5
		29-37	38			29-37	13
		38-48	7			38-48	4
	5-12	0	26		5-12	0	25
		10-19	—			10-19	—
		20-28	6			20-28	—
		29-37	24			29-37	17
		38-48	25			38-48	19
Black Spruce	1-2	0	44	Red Pine	1-2	0	28
		10-19	—			10-19	—
		20-28	9			20-28	3
		29-37	19			29-37	—
		38-48	4			38-48	—
	3-4	0	16		3-4	0	13
		10-19	—			10-19	—
		20-28	3			20-28	16
		29-37	11			29-37	—
		38-48	8			38-48	—
	5-12	0	26		5-12	0	29
		10-19	—			10-19	—
		20-28	—			20-28	13
		29-37	5			29-37	9
		38-48	3			38-48	—
Jack Pine				Balsam Fir	1-2	0	44
						10-19	—
	5-12	0	32			20-28	7
	5-12	123	33			29-37	12
						38-48	5

The 5-12 foot class jack pine showed about 55 percent mortality, while smaller jack pine not included in the study sampling showed 100 percent mortality. At Squaw Lake (flooded more than two months), 70 percent mortality in white pine 15-30 feet in height was observed. Complete mortality occurred in the white spruce up to 3 inches in diameter breast high, and 15 feet tall, the only size class available. At Rainy Lake (flooded for more than two months), all sizes of balsam fir showed 90-100 percent mortality. Large, mature white spruce survived with no visible damage.

Analysis of stand composition may provide some information on past high water levels, using the transition zone between the more flood tolerant species and the intolerant species as the possible boundary line. For example, in the Squaw Lake area, mature American and rock elm, red and bur oak, and balsam poplar survived flooding while the associated species, paper birch, was killed. At Rainy Lake, aspen, balsam poplar, black ash, red maple, bur oak, and basswood all showed no noticeable injury from flood. Balsam fir, however, was almost entirely killed. Although both paper birch and balsam fir reestablish readily after flood recession, the margin between areas of older trees and areas containing mostly younger trees of these species might serve as an indicator of past flood levels, as well as revealing when past floods occurred.

Summary

Weather conditions of the fall and winter of 1949 resulted in flood conditions during the spring of 1950 adjacent to lakes and streams and on many lowlands in northern Minnesota. Flood prevailed for as long as four months in some areas. The subsidence of the water made possible observations on trees flooded for periods varying from a few days up to most of the growing season.

At the Basswood Lake area, proximity to the Quetico-Superior Wilderness Research Center made possible more intensive study of the affected trees. Special attention was directed to the effect of flooding on growth rate of terminals, on the ability of the foliage to endure and recover from submergence, and on tree mortality for white pine, red pine, jack pine, white spruce, black spruce, and balsam fir. The observations were continued through 1951, the year following flooding. Data on mortality and general observations in other flood areas were completed in 1952. The data collected have been summarized by species, size-class, and length of the submergence period.

For the conditions prevailing in this study, balsam fir and black spruce appeared to be the most flood resistant, as indicated by better crown recovery and less reduction in terminal growth as well as by better survival. Relative survival for submergence periods up to 48 days was: balsam fir, black spruce, white spruce, white pine, and red pine in decreasing order. However, all these species plus jack pine were killed by flood periods of greater duration. No observations were made on jack pine for shorter flood periods. Observations on several other areas indicated that balsam fir was less tolerant of flooding than most of the associated hardwoods such as aspen, American elm, rock elm, black ash, red maple, basswood, red oak, bur oak, and balsam poplar. Of the hardwoods, paper birch suffered most heavily.

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History of Sequoia, Cedrus Plantings Sought

Professor E. E. Stanford, Department of Botany, College of the Pacific, Stockton, Calif., is undertaking a study of plantings of the genera Sequoia and Cedrus throughout the United States. He is interested in receiving information from foresters who have knowledge of any plantings in their area. Especially desired is information on the history of older plantings, whether successful or not, with reference not only to their location but to date of establishment and the names of individuals responsible for establishment. Any notes concerning causes of lack of success of planted trees will also be appreciated.

Observations Concerning the Lakeview Federal Sustained Yield Unit and Similar Areas

Clifford W. Wylie
Lakeview, Oregon

AFTER A PERIOD of approximately six years, the Lakeview Federal Sustained Yield Unit in Lake County, Oregon has raised some interesting issues. This may be also said of units in other regions.

The following article will attempt to bring to light some of these issues while remaining relatively neutral in presenting the facts concerning them.

Many Problems Yet to Be Resolved

A discourse on the pros and cons of the federal sustained yield unit is not intended in this article, but fairly warm reactions to this subject may have been noted in the newspapers and periodicals as the supply of available timber during our high level of economy becomes more scarce.

Where mills have thrived in the past, because of a large supply of private timber, we now find these same mills crying for timber. If they are on the outer fringe of a federal sustained yield unit, they are not hesitant in saying that they should be allowed to bid on such timber. The future will tell if these mills and their logging operators could still pay for the long haul necessary to reach such timber, and many signs indicate that they may be able to do this and yet obtain a profit. Even when the region does not have a sustained yield unit, a new mill coming in to set up for utilization of national forest timber is greatly frowned upon by the local industries that are looking ahead to a decreasing supply of logs.

The fact that the inadequate supply of timber is gradually eliminating large and small mills alike will no doubt result in a great deal more discussion in our local, state, and federal legislatures. As the original timber stands were cut in the South, East, and Lake States, many of the mills in those regions had the opportunity and did journey to the western states. Now, however, there is nowhere else to go in the continental United States. Difficult questions will have to be answered such as: "Who is to say why certain mills should live protected by governmental policies, while others die or stagnate?", and "Why shouldn't permanent communities be stabilized by the knowledge of a continuing supply of wood?"

The communities of Lakeview and Paisley, Oregon, comprising some 3,500 population, which were to be the direct beneficiaries of the sustained yield unit may be considered prosperous compared to the state average. A local executive of the Chamber of Commerce, when asked about this fact, was not hesitant in saying, "The communities' bank deposits are higher, more goods and services are sold, and employment is higher since the unit was established." Nevertheless, if the unit were not in effect, it is possible to say that these two communities would still be prosperous. Only later years will tell the full story on stabilization of communities.

Even within a federal unit one hears that perhaps more benefit would evolve to the community concerned if national forest timber were available to outside industries, supposedly at higher bid prices, because of the payment to counties of 25 percent of receipts on national forest timber sold in that county. Free enterprise in the theoretical sense and policies for the good of the majority of the people are sometimes separated by a wide breach, but these two dynamic parts of our society have carried us a long way, and in each case have resolved themselves by clear thinking and study by all concerned.

History of the Unit

The Lakeview Federal Sustained Yield Unit was officially established October 10, 1950, and the policy statement was approved February 26, 1951. The unit was formed through the joint efforts of a number of community organizations headed by the Lakeview Chamber of Commerce, the U. S. Forest Service, and State of Oregon representatives in both houses of Congress.

The Sustained Yield Unit Act of March 29, 1944, and subsequent regulations read in part, conferred upon the chief of the Forest Service, authority to establish federal sustained yield units when the action is judged to be in the public interest in order to:

(a) Stabilize communities (in this case Lakeview and Paisley, Oregon), forest industries, employment, and taxable forest wealth.

(b) Assure a continuous and ample supply of forest products.

(c) Secure the benefits of forests in regulation of water supply and stream flow, prevention of soil erosion, amelioration of climate, and preservation of wildlife."

Some Technical Aspects of Act

Sawlogs from the unit must be manufactured within a six mile radius of the courthouse in Lakeview, Oregon or within a three mile radius of the center of Paisley, Oregon. Objections to this restriction prior to the establishment of the unit were voiced by a California concern through its representatives in Congress, but the objections did not alter the boundaries of the unit to include any California industries.

"Manufacture" in the sense used means cutting of logs in sawmills into rough green lumber containing the approximate percentage of various dimensions of lumber usually produced by mills of the same size in the ponderosa pine region of eastern Oregon plus five manhours of work per thousand board feet in refinement beyond

the rough green lumber stage.

In other log using plants, manufacture must show the equivalent degree of employment on the material.

The objective of the Forest Service was to design the sale program for the unit so active competition for the purchase of timber would be possible and so efficient logging and manufacturing operations of various sizes could be accomodated.

At least every ten years, the regional forester will analyze the results obtained through application of policies to determine if these objectives of the unit are being attained. It is possible to revoke the unit if the objectives are not being met.

It may be of interest to note that Section 3 of the Sustained Yield Unit Act provided that the Secretary of Agriculture and Secretary of the Interior severally are authorized "to determine and define the boundaries of the community or communities for whose benefit such unit is created, and to sell, subject to such conditions and requirements as the Secretary believes necessary, federally owned or administered timber and other forest products from such unit *without competitive bidding* at prices not less than their appraised values to responsible purchasers within such community or communities."

The unit is comprised of land within the Fremont National Forest in Lake and Klamath Counties in Oregon. Approximately 88 percent of the merchantable timber available by volume is ponderosa pine, 10 percent is white fir (*Abies concolor*), and lesser amounts include sugar pine, white pine, lodgepole pine, and incense cedar.

A study by the Forest Service in 1948 showed that 50 percent of the people in Lakeview and Paisley, Oregon were directly or indirectly dependent on forest resources or their utilization.

The number of industries that may participate in the amount of timber available is not limited by the law, and there is nothing which would prevent other operations from establishing themselves inside the unit and bidding on the timber. The only requirement is that they be established within a six mile radius of Lakeview, or within a three mile radius of Paisley.

Absence of Competition Declared

One of the most frequent criticisms heard in connection with the Lakeview Unit is the absence of competition in bidding on the various tracts of timber and, in the same breath, a consequental minimum price for the stumpage sold. Extremely high stumpage prices sometimes catch our eyes in the newspapers, and may ring in our ears at oral auctions. Naturally, high stumpage figures are given a certain amount of publicity by the newspapers. This may be one reason why criticism of normal stumpage prices is heard in the Lakeview area.

Lakeview is a semi-isolated community, and the nearest wood using industries outside of the immediate vicinity are almost one hundred miles away, that is to say those industries within the boundaries of the State of Oregon. A few California sawmills are somewhat closer.

Within the unit are four sawmills and seven remanufacturing plants of five distinct companies using approximately 75,000,000 board feet of timber annually of which 53,000,000 feet has recently been the allowable cut from the unit. Stands of mature private timber in the area are becoming very scarce, except for one large block owned by a firm not operating a manufacturing plant in Lake County. The dependency upon federal timber will become more acute in the next few years if the present level of business maintains itself.

Recent Stumpage Prices

In 1955, one large block of timber in the unit of approximately 90,000,000 board feet was successfully bid at a price of $20.60 for the ponderosa pine, and $2.00 per thousand board feet for the white fir. This sale runs for six years, and hence concerns the year we are in at present. The bidder in this case had to construct about 25 miles of mainline road to USFS specifications into an area of no prior logging.

Although the above mentioned sale is somewhat larger than the average, it is used as an example mainly because the grade recovery from the logs on this sale was available to the author as shown in Table I.

It is interesting to go a step further into stumpage prices to see how the unit's sales compare with the sales outside of the unit.

All timber sales used were within the Fremont National Forest. However, the unit comprises only a portion of the Fremont National Forest and many timber sales are made outside of the unit proper. In this way, it was hoped to provide an indication, if any, of lack of competition within the unit with resultant lower stumpage prices.

Ponderosa pine and more recently white fir are the two main species harvested in the area, comprising more than 95 percent of the annual cut.

The following figures are used as a comparison for the years 1952 through 1955 for a picked group of sales on which road development costs per thousand board feet were relatively equal:

PONDEROSA PINE

	Sustained Yield Unit	Outside of the unit
No. of sales	8	4
Total footage	209 MM	126 MM
Total amt. pd.	$4,977,750	$2,928,950
Av. price per M bd. ft.	$23.82	$23.25

WHITE FIR

	Sustained Yield Unit	Outside of the unit
No. of sales	8	4
Total footage	88 MM	23 MM
Total amt. pd.	$193,400	$41,850
Av. price per M bd. ft.	$2.20	$1.82

At best, however, this type of comparison is quite general due to differences in timber quality, development, transportation costs, etc., but a large enough area was covered within the unit and outside of it to present a good working comparison.

Sales from adjacent national

forests compare favorably with the averages obtained here, and we may conclude from this that the average bid prices for timber within the unit are in line with the average bid prices on unrestricted sales outside of the unit.

Costs

By breaking down the costs considered to be representative of the Lakeview mills by the author, Table 2 gives us a stumpage value of $20.85 for the ponderosa pine, and $1.04 for the white fir on the above mentioned sale of 90,000,000 feet. In connection with these costs, it may be added that the wood using industries in Lakeview are considered efficient, and the utilization of the log is up to current industry standards.

The original appraised and bid price of $20.60 on the pine shows it to be within a few cents of the figure arrived at in Table 2, and the white fir appears 96 cents lower than the bid price. The appraised price includes road requirements but not slash disposal or timber stand improvement costs. Quarterly adjustments up or down on the bid prices are provided for according to future lumber index prices.

Table 2 is used to acquaint the reader with one method of appraisal, and should help to show where differences of opinion can arise in determining a price for stumpage.

It is the opinion of the author that in the above case the stumpage value bid by the successful buyer of the timber was reasonable, as the table gives the actual sales value of the lumber obtained, and we can see how close it actually came to the appraisal value of the timber. A mill manager within the unit has this to say about lumber prices used in connection with timber appraisals, "Lumber prices are still not stable in an industry known for its instability of prices, and a few dollars drop in lumber prices can wipe out the margin necessary for profit and risk."

As a conclusion to our criticism regarding lack of competition, it is, of course, rather difficult to maintain a high level of competition in an isolated area such as Lakeview. It is doubtful if any mills outside of the unit could afford to bid much higher than is done now, and still make the long haul back to their own manufacturing facilities with anything left over for their necessary profit. Actually, few mills bid on Lakeview timber in the past because of the distances involved. However, one mill owner in California on the fringe of the unit said, "We would have no trouble at all in buying logs from the unit, hauling them to our mill, and showing a profit after remanufacture of these logs."

In connection with the large road requirements on many of the sales, it may be interesting to note what the Congressional subcommittee investigating federal timber sales policy in the Northwest has to say:

"In order to encourage construction of high cost roads, the agencies (USFS) have considered it necessary to offer large long term sales. The effect of this is to reduce the number of potential bidders, and actually to result in the sales of federal stumpage at reduced prices. These large sales are out of the competitive range of small, medium, and at times even some of the larger concerns, because of the tremendous amounts of working capital required."

TABLE 1.—LUMBER GRADE RECOVERY VALUES

Grades all thicknesses	Price per M bd. ft.	Percent of lumber scale—green chain
PONDEROSA PINE		
1 & 2 Clear	$268.78	0.8
"C" Select	254.86	1.3
"D" Select	212.41	4.8
Moulding 4/4	160.61	.4
Moulding 5/4	191.04	2.7
Shop 4/4	74.48	1.1
#1 Shop	138.19	5.6
#2 Shop	108.05	17.5
#3 Shop	75.72	3.3
#3 Clear	177.89	1.4
#2 & Btr. Common	119.01	7.7
#3 Common	76.18	19.5
#4 Common	63.00	27.7
#5 Common	35.21	5.7
Timbers	75.00	0.5
Value per M bd. ft. lbr. scale green chain		$ 97.77
Value per M bd. ft. log scale basis (with 4 percent overrun)		$101.67
Value per M bd. ft. log scale with a 10 percent loss from green to dry shipping basis		$ 91.50
WHITE FIR		
5/4 "C" & Btr. Select	$143.12	0.1
5/4 "D" Select	134.40	0.1
5/4 Moulding	105.17	1.3
5/4 #3 Clear	129.50	0.1
5/4 #1 Shop	108.37	0.4
5/4 #2 Shop	79.32	1.3
5/4 #3 Shop	61.99	0.8
4/4 #2 & Btr. Common	78.07	0.2
4/4 #3 Common	75.00	0.8
4/4 #4 Common	62.80	1.3
4/4 #5 Common	38.51	0.3
1-5/8 #1 Dimension	76.61	22.9
1-5/8 #2 Dimension	76.61	29.4
1-5/8 #3 Dimension	60.14	19.4
1-5/8 #4 Dimension	30.77	21.4
Timbers	80.25	0.2
Value per M bd. ft. lbr. scale green chain		$ 63.90
Value per M bd. ft. log scale basis (30 percent overrun)		$ 83.07
Value per M bd. ft. log scale with a 2 percent loss from green to dry shipping tally		$ 81.41

The grade recovery was based on an actual study of logs on the sale and the prices were lumber prices at the time of the sale. They are Western Pine Assn. average prices F.O.B. dry surfaced basis, and commissions and cash discounts have not been deducted.

Effects of Extremely High Stumpage Prices

High stumpage prices, often far above the appraisal figure, are not necessarily a healthy sign for the lumber industry, and often there are other intriguing reasons for the price paid. True, efficiency may account for a few moderately higher prices, but other patent reasons may include: (1) attempting to shut out a competitor, (2) gaining access to other timber already owned or prospective, and (3) in some regions of timber scarcity it may be a do or die effort to obtain logs to keep the mill going, for the time being at least.

The high stumpage prices in most probability will reflect higher lumber prices in a market where lumber is competing with a host of other good materials, many of which have replaced wood, often because of the price factor. Although lumber products have had excellent market conditions for the past few years, the market is not a one way street. New customers for wood products gained today because of reasonable prices will be most welcome in a business turn down. With labor and operating costs continually going up, the lumberman looks more and more to stumpage as his break-even point.

The mills in the Lakeview area are certainly endeavoring to cut their costs through more efficient production and utilization. Investment in new and more efficient equipment is made with the thought of a continuing supply of logs at a price which will afford a fair margin for profit and risk.

The Forest Service in Lakeview has, in most cases, come up with reasonable prices for stumpage, and shown judgement in contending with problems which arise in determining these prices. Their means of arriving at stumpage values are not always too clear, and their methods used, as in many governmental agencies, are not always flexible enough to take care of local conditions, but cooperation with representatives of the lumber industries and vice versa will help in the future.

Appraisals

Timber appraisals in connection with the Lakeview Unit have come in for their share of criticism. The mill owners within the unit point to a clause in the policy statement for the unit which says:

"Unless approval of the Regional Forester is given in advance, purchasers who have been awarded sales within the Unit shall not bid on, or otherwise become involved in, other offerings of national forest timber outside the Unit for primary manufacture within the Unit or within the Lakeview or Paisley communities."

In an area of very little private commercial-size timber, the foregoing statement is equivalent to setting the unit up as the one and only stumpage seller.

The mill owners within the unit believe they are on the defensive as far as appraisals go, because timber to keep them operating cannot now be bought from any other source but the unit itself. Hence, if an appraised price is thought to be too high, there is no recourse but to bid that price, and hope to cut the mill costs somewhere else if the mill is to keep operating at a profit. Of course, the mill owners can and do attempt to make their position clear to the Forest Service in a case such as this, and then hope for some concessions. The unit itself has no competition for the sales of its timber, which in retrospect is likened unto the criticism directed toward the lumbermen in not competing strongly enough with each other for the unit's timber.

The appraisal problem, ever present on any kind of timber sale, is brought into sharp focus in the Lakeview Unit due to the limited number of buyers and sellers of timber. The timber appraisal must be as exact as humanly possible, and to do this a freer exchange of pertinent information on the part of both buyers and seller would lend itself well to precise appraisal work.

TABLE 2.—COSTS FOR PONDEROSA PINE AND WHITE FIR COMBINED[1]

LOGGING COSTS (Log scale)		
Logging and overhead	$15.75	/M
Transportation—25 mile haul (depreciation, maint., operating cost)	10.00	
Road development	6.00	
	$31.75	/M bd. ft. log scale
MILLING COSTS (Lumber scale)		
Sawmill (incl. pond & green chain)	$11.00	/M
Lumber yard costs	9.10	
Dry kilns	1.50	
Selling & commissions	4.40	
Planer	4.30	
Margin for profit & loss, shipping, general expense	7.10	
	$37.40	
PONDEROSA PINE		
Value per M bd. ft. of the lumber (log scale) dry shipping basis (Table 1)	$91.50	
Total costs log scale after increasing the milling cost of $37.40 by the amount of the overrun which is 4 percent	$70.65	
Residual for stumpage	$20.85	
WHITE FIR		
Value per M bd. ft. of the lumber (log scale) dry shipping basis (Table 1)	$81.41	
Total costs per M bd. ft. log scale after increasing the milling costs of $37.40 by the amount of the overrun which is 30 percent	$80.37	
Residual for stumpage	$ 1.04	

[1]The above costs are considered to be representative of the area and include supervision but not taxes.

Private Forestry Lacking

A final disturbing issue is the fact that private forestry of any type has not noticeably advanced in this region. The acreage of private commercial forest land is 28

percent in Lake County compared to 72 percent for federal timberlands. Most private lands have been cut over, and should be producing a large growing stock to supplement the log supply in the future years. Some few private lands are fully stocked, but the majority are not considered managed or even as growing a crop of trees for future use. Stagnated stands are common, where trees fifty years old may be only an inch or two in diameter. Christmas trees are cut and sold with no regard to the principles of forest or Christmas tree management.

The dominating influence of public lands, and public foresters to provide the timber, and the reliance upon the unit itself to supply the future timber is in most probability one big factor causing this situation. Letting Uncle Sam do it isn't a very ambitious or intelligent outlook. An increasing interest in private forestry in Lake County could do much toward supplementing the timber yield and be of great benefit to the community.

The capacity of the wood using plants in Lake County even at the present time is far above what the unit can provide now and in the future. Hence, a large and profitable gap could be filled by private timber. Future utilization of wood could foreseeably create a still larger demand for logs, and thereby use the total production of forest land under rather intensive management.

This problem of small landowners and private forestry exists over most of our country, and is mentioned here only to attempt to show a correlation between private forestry, or lack of it, and the national forest with its sustained yield units.

Conclusion

In closing, it must be noted that a federal sustained yield unit has many defenders of its policies, and also many critics, even within its own environs. Fortunately, it appears that most of the criticisms can be worked out by intelligent handling of each problem and cooperation of the interested parties. The federal sustained yield unit concept is still young and is bound to experience a few bumps and bruises as it matures.

Some of the criticisms mentioned in this paper, such as low stumpage prices due to lack of competition, do not appear to be valid as shown by the facts presented. The criticism denoting lack of interest in private forestry, because of the influence of the unit, is a conjecture, although it may be an educated conjecture.

The Lakeview Federal Sustained Yield Unit is serving the purpose for which it was intended thus far, as it affords a security for the communities of Lakeview and Paisley, Oregon. They are assured of a specified amount of timber each year that will be utilized to a high degree within their own boundaries, which affords a continuity of life now and in the future for these towns that it is difficult to visualize without the unit.

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Editor's note.—The reader is referred to the news item "Discontinues Establishment of Sustained Yield Units" on p. 699 of this issue of the JOURNAL.

Determination of Form Class of Standing Trees With An Angle Gauge

E. C. Gockerell
Department of Natural Resources,
Port Angeles, Washington

FORM CLASS of standing trees may be easily determined from the ground with the use of the angle gauge, prism, or Relaskop used in the variable plot method of cruising. The method has great advantages and should be simple enough to expedite inventory work considerably. The scheme is based on solution of right triangles and on d.i.b.: d.o.b. ratios at 16 feet and at 32 feet for Douglas-fir and western hemlock.

Form class tables have shown their merit in recent years; more and more foresters are using them with confidence. This is understandable since the theory of form class tables recognizes that the rate or degree of taper differs widely between species, and trees of a given species taper dissimilarly in different areas depending upon site, age, elevation, density, crown class, etc.

Determining form class in most areas is a laborious procedure. Frequently, form class varies so widely within a stand that numerous measurements are required to establish an accurate average. Where down trees or freshly cut logs are not available, trees must be climbed to make necessary measurements. Even on down trees care is required because bark on such trees is frequently shrunken to the point where erroneous results are obtained. Also, down trees are most often suppressed or intermediate trees, which very often have a form class that is not representative of the main stand.

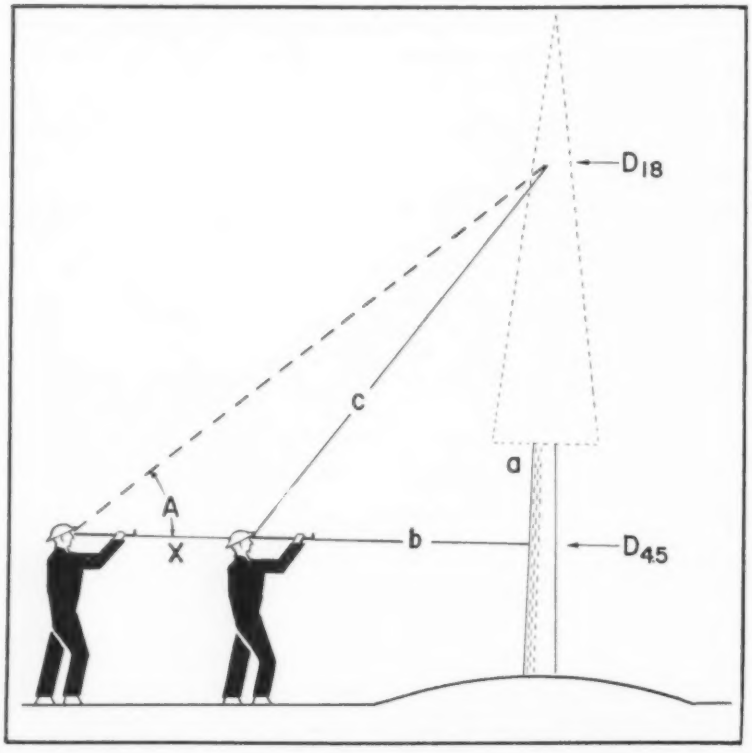

FIG. 1.—Diagram showing how outside bark diameter at top of first log may be determined by use of an angle gauge, measuring only d.b.h. ($D_{4.5}$) of the tree and the distance, x, between the plot radial distance and the point at which the critical angle just subtends the upper tree diameter.

Method and Derivation

When an observer positions himself so that his angle gauge just subtends a tree's diameter at breast height, his distance from the tree will equal a constant times the tree's diameter. This distance is the plot radial distance (Fig. 1). The constant for an angle gauge with a critical angle of 104.18 minutes is 2.75. Thus for a 12-inch tree the plot radial distance is 2.75×12, or 33 feet. A critical angle of 104.18 minutes is recommended for determination of 16-foot form class of trees less than 28 inches d.b.h. Thirty-two-foot form class is usually determined for larger trees, and for this purpose an angle gauge with a critical angle of 164.73 minutes (constant=1.739) is recommended. Relaskops and prisms may have other critical angles and hence constants.

An observer standing on a circumscribed circle whose radius equals the plot radial distance will have to move toward the tree to cause the critical angle of his angle gauge to just subtend the diameter of the tree at 18 feet (top of the first 16-foot log) for 16-foot form class. It is apparent that the distance that he moves forward depends on the diameter outside bark at breast height and at 18 feet. From easily established relationships, the diameter outside bark at 18 feet may be calculated. After allowance for bark thickness at this point, form class may be determined.

Derivation of equations for construction of curves and tables showing form class by distance that the observer moves toward the tree and tree d.b.h. is as follows, using symbols from Figure 1:

$c=\sqrt{a^2+b^2}$

and

a=breast height to top of first 16-foot log
$=18^1-4.5$
$=13.5$
$b=2.75D_{4.5}-x$

Therefore

$c=\sqrt{182.25+7.5625D_{4.5}^2-5.50D_{4.5}x+x^2}$.

This gives the length in feet of the line of sight, c. Using the known constant, 2.75:

$$D_{16}=c/2.75$$

Conversion of outside bark diameter to inside bark at the top of the first log is made by using inside bark-outside bark ratios. The ratios shown in Table 1, developed by Mason, Bruce, and Girard,[2] are believed to provide reasonable approximations in most instances. The range found at different locations indicates, however, the desirability of establishing the ratio locally if at all possible.

Douglas-fir 16-foot form class based on the average ratio, then is

$$F.C._{16}=\frac{D_{16}x\ .901}{D_{4.5}}=\frac{(c/2.75).901}{D_{4.5}}$$

substituting for c

$$F.C._{16}=\frac{.901\sqrt{182.25+7.5625D_{4.5}^2+x^2-5.50D_{4.5}x}}{(2.75)(D_{4.5})}$$

[1]Using 18 feet allows for .3-foot trim allowance and a 1.7-foot stump. The top of a 32-foot log is assumed to be at 34.6 feet, allowing for a .6-foot trim and a 2-foot stump.

[2]The author gratefully acknowledges the use of the bark ratio data kindly supplied by Mason, Bruce, and Girard, Consulting Foresters, Portland, Oregon.

TABLE 1.—D.I.B.:D.O.B. RATIOS AT TOP OF FIRST LOG FOR DOUGLAS-FIR AND WESTERN HEMLOCK

Species	Log length	Ratio	
		Average	Range by locations
Douglas-fir[1]	16-foot	.901	.889-.912
Douglas-fir[1]	32-foot	.918	.902-.941
Western hemlock	16-foot	.944	.941-.948
Western hemlock	32-foot	.944	.941-.948

[1]Data from trees over 75 years old.

Form class, calculated from this equation, for trees ranging in diameter from 12 to 28 inches and various distances, x, are given in Table 2. Tables 3, 4, and 5 are for Douglas-fir 32-foot form class, hemlock 16-foot form class, and hemlock 32-foot form class, respectively. Figures 2 and 3 show graphs of the equations for 16-foot form class and are useful for rapidly determining approximate values. Graphs for 32-foot form class are not shown.

In the field the 18- and 34.6-foot points on the tree may be located with an Abney level. Since the plot radius distance is dependent on d.b.h., the angle to fixed heights on the trees may also be calculated from d.b.h. Calculated angles and percents are given in Table 6.

Field Procedure

The steps to be taken for determining the form class of a standing tree are as follows:

1. Measure the d.b.h. of the tree.
2. Go to the outer edge of the circumscribed circle (plot radial distance from the tree). This distance, of course, need not be measured: when the critical angle just subtends d.b.h. the proper distance is obtained.

The side of the tree to be measured is selected so as to get the average width to avoid error when the trees are oblong or elliptical. It was found that the d.i.b.: d.o.b. ratio at the top of the first log varies as pointed out by Mason, Bruce, and Girard, but this variance seemingly had little effect on the measurements.

3. Mark a spot on the ground where you are standing.
4. From Table 6 find the appropriate angle or percent for the d.b.h. of the tree and the 18- or 34.6-foot point. Using this angle, locate the top of the first log with an Abney level.
5. Walk forward until critical angle just subtends tree diameter at the point located in step 4. Mark spot on the ground where you are standing.
6. Measure the distance in feet between points 3 and 5, and look up the form class from the graphs or tables, according to the d.b.h. of the sampled tree.

The examiner must, of course, pick a reasonably level area in which to measure the tree since the entire theory is based on solution of right-angled triangles.

TABLE 2.—DOUGLAS-FIR 16-FOOT FORM CLASS FOR TREES OF DIFFERENT DIAMETERS, AND FOR A RANGE OF "X" DISTANCES DETERMINED FROM ANGLE GAUGE MEASUREMENTS[1]

Distance "X"	D.b.h.—Inches				
	12	16	20	24	28
Feet	*Form class*				
2	92.3	90.3	89.6	89.3	89.2
4	87.3	86.4	86.4	86.6	86.9
6	82.4	82.5	83.3	84.0	84.6
8	77.6	78.7	80.1	81.3	82.3
10	72.8	74.9	77.0	78.6	80.0
12	68.2	71.0	73.8	76.0	77.7
14	63.6	67.4	70.7	73.3	75.4
16	59.3	63.6	67.6	70.7	73.1
18	55.1	60.0	64.5	68.1	70.8
20	51.2	56.4	61.4	65.4	68.5
22				62.8	66.3
24					64.0

[1]Critical angle, 104.18 minutes. DIB:DOB ratio .901

TABLE 3.—DOUGLAS-FIR 32-FOOT FORM CLASS FOR TREES OF DIFFERENT DIAMETERS, AND FOR A RANGE OF "X" DISTANCES DETERMINED FROM ANGLE GAUGE MEASUREMENTS[1]

Distance "X"	D.b.h.—Inches					
	28	32	36	40	44	48
Feet	*Form class*					
10	92.4	90.2	89.0	88.1	87.6	87.3
14	86.6	84.8	83.8	83.4	83.2	83.3
18	81.1	79.5	78.9	78.8	78.9	79.3
22	75.8	74.5	74.1	74.3	74.7	75.3
26	71.1	69.7	69.5	69.9	70.6	71.4
30	66.8	65.2	65.1	65.6	66.5	67.5
34	63.1	61.2	60.9	61.5	62.4	63.7

[1]Critical angle, 164.73 minutes. DIB:DOB ratio .918

TABLE 4.—WESTERN HEMLOCK 16-FOOT FORM CLASS FOR TREES OF DIFFERENT DIAMETERS, AND FOR A RANGE OF "X" DISTANCES DETERMINED FROM ANGLE GAUGE MEASUREMENTS[1]

Distance "X"	D.b.h.—Inches				
	12	16	20	24	28
Feet	*Form class*				
2	96.7	94.6	93.9	93.6	93.4
4	91.5	90.6	90.6	90.8	91.0
6	86.4	86.4	87.2	88.0	88.6
8	81.3	82.5	83.9	85.2	86.2
10	76.3	78.5	80.6	82.4	83.8
12	71.4	74.4	77.4	79.6	81.4
14	66.7	70.6	74.1	76.8	79.0
16	62.1	66.7	70.8	74.1	76.6
18	57.7	62.8	67.6	71.3	74.2
20		59.1	64.4	68.6	71.8

[1]Critical angle, 104.18 minutes. DIB:DOB ratio .944

TABLE 5.—WESTERN HEMLOCK 32-FOOT FORM CLASS FOR TREES OF DIFFERENT DIAMETERS, AND FOR A RANGE OF "X" DISTANCES DETERMINED FROM ANGLE GAUGE MEASUREMENTS[1]

Distance "X"	D.b.h.—Inches					
	28	32	36	40	44	48
Feet	*Form class*					
10	95.0	92.8	91.5	90.6	90.1	89.8
14	89.0	87.2	86.2	85.8	85.6	85.6
18	83.4	81.8	81.1	81.0	81.2	81.5
22	78.0	76.6	76.2	76.4	76.8	77.4
26	73.1	71.7	71.5	71.9	72.6	73.4
30	68.7	67.1	66.9	67.5	68.4	69.4
34	64.9	62.9	62.6	63.2	64.2	65.5

[1]Critical angle 164.73 minutes. DIB:DOB ratio .944

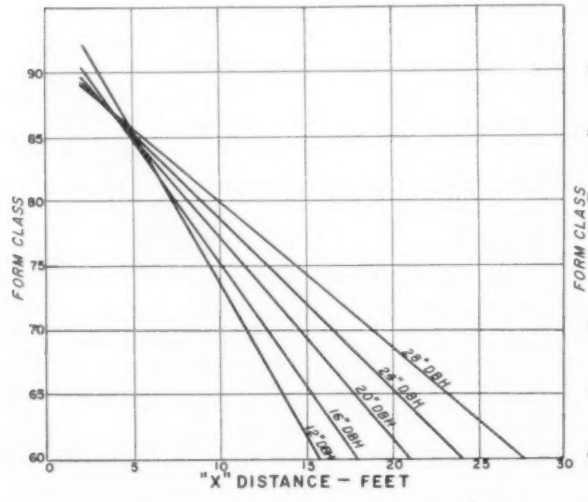

FIG. 2.—Form class determination graph for Douglas-fir 16-foot log. Angle gauge critical angle, 104.18 minutes. d.i.b.:d.o.b. ratio .901.

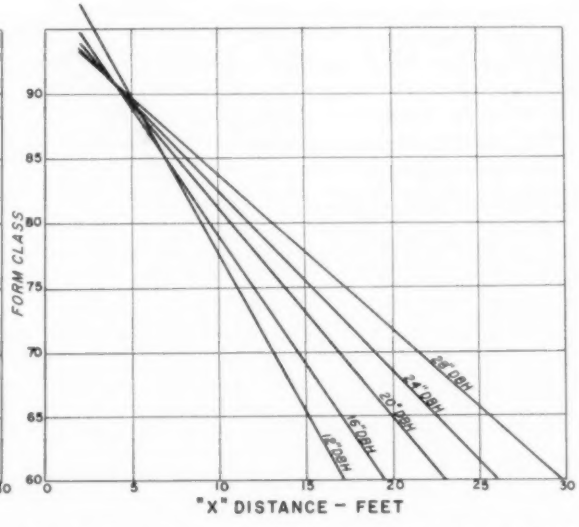

FIG. 3.—Form class determination graph for western hemlock 16-foot logs. Angle gauge critical angle, 104.18 minutes. d.i.b.: d.o.b. ratio .944.

TABLE 6.—ANGLES MEASURED FROM THE PLOT RADIAL DISTANCES TO THE 18- AND 34.6-FOOT POINTS ON TREES OF DIFFERENT DIAMETERS

D.b.h.	Angle: 16-foot form class[1]		D.b.h.	Angle: 32-foot form class[2]	
Inches	*Degrees*	*Percent*	*Inches*	*Degrees*	*Percent*
10	26	49	26	33-½	67
11	24	45	28	31-½	62
12	22	41	30	30	58
13	20-½	38	32	28-½	54
14	19-½	35	34	27	51
15	18	33	36	25-½	48
16	17	31	38	24-½	46
17	16	29	40	23-½	43
18	15-½	27	42	22-½	41
19	14-½	26	44	21-½	39
20	14	25	46	20-½	38
22	12-½	22	48	20	36
24	11-½	20			

[1]Angle to 18-foot point. Critical angle 104.18 minutes
[2]Angle to 34.6-foot point. Critical angle 164.73 minutes

Results

In field tests the author made 20 form class measurements of standing trees in second growth Douglas-fir and hemlock with diameters ranging from 11.8 inches d.b.h. to 24.0 inches d.b.h. Form class for each tree was determined by actually climbing the trees and then measurements of these trees were made by using the angle gauge. Ground measurements of x distance were measured to the nearest ½ foot. Form class reading from ground measurement as compared to actual varied 2 unit on 2 trees and the remainder of the measurements were exactly equal to or varied ½ and to 1½ units, with the majority of measurements less than 1 unit. Normally the measurements would be carried to the nearest whole number—.75, .76, .83, etc.

Summary

The theory of variable plot cruis-

ing can be used advantageously in developing a method for determining form class of standing trees while on the ground. The procedure for developing the graphs and tables necessary for form class determination has been discussed. Graphs and tables are shown in this article for 16-foot form class of second-growth Douglas-fir and western hemlock trees ranging from 12 inches d.b.h. to 28 inches d.b.h. Tables for 32-foot form class are given for large Douglas-fir and western hemlock ranging from 28 to 48 inches d.b.h.

Graphs can be developed for any species, provided that the d.i.b.: d.o.b. ratios at the top of the first 16.3-foot log or the first 32.6-foot log are known, using the critical angle of the angle gauge, prism, Relaskop, or other instruments developed for variable plot cruising.

Planting Pines in Pocosins[1]

Wm. D. Miller and T. E. Maki
School of Forestry,
North Carolina State College,
Raleigh

POCOSINS (pronounced poh-koé-sens) are wet upland bogs with varying depths of black, soft muck, (or less frequently, even brown, fibrous peat) underlain by sands, silt, or clay. Their geologic origin is somewhat obscure, but their occurrence is very common in the coastal plains of the Carolinas and southeastern Virginia. In North Carolina, alone, the pocosin area is estimated at nearly a million and a half acres. The poor natural drainage of these upland bogs is attributed mainly to lack of gradient and to impermeable subsoils.

Some of the more extensive and typical pocosin land in North Carolina is found within the 80,000-acre Hofmann Forest in Jones and Onslow Counties. The Hofmann Forest gives rise to three major streams, yet the greater portion of it is poorly drained (Fig. 1). The predominant vegetative cover consists of more or less scattered stands of pond pine (*Pinus serotina* Michx.), usually with dense undergrowth of gallberry, bay, cyrilla, and other shrubs, but occasionally with extensive reed beds. In the wettest areas, pines may be practically absent, or at least too stunted and malformed to be marketable.

Poor drainage has not been the only factor keeping timber productivity of pocosins at a low level. Frequent and severe wildfires have left the stands understocked, the growth reduced, and the stems deformed or otherwise defective (Fig. 2). Recent Forest Survey data[2] for the coastal plain of North Carolina show that pond pine areas produce an average of 0.5 cords per acre per year, less than any other type of the region.

Management plans on the Hofmann Forest call for early removal of the overmature, mature, and defective elements in the stands, and subsequent encouragement of the younger and thriftier components mainly through improvement of drainage and control of wildfires. In addition, loblolly pine, slash pine, and other species are being planted on an experimental basis to determine how successfully they

[1]Contribution from the Forestry Department, North Carolina Agricultural Experiment Station, Raleigh, N. C. Published with the approval of the Director of Research as Paper No. 793 of the Journal Series.

FIG. 1.—Canal being excavated along the old Quakerbridge Road which crosses the Hofmann Forest. Note ragged pond pine stand in the background, and level terrain with high water table. The gradient is so slight that the canal shows practically no flow at this point.

[2]McCormack, James F. Forest statistics for the Northern Coastal Plain of North Carolina, 1955. Forest Survey Release No. 45, Southeastern Forest Expt. Sta. 1955.

FIG. 2.—Remnants of a pond pine stand on a very poorly drained section of the Hofmann Forest. The area shown here has been frequently swept by severe wildfires, the latest occurring in April 1950, just 3 years before this photo was taken. The soil is brownish-black muck to a depth of 6 feet, underlain by fine sandy clay loam. The measured tree is 8 inches in diameter, breast high and shows the typically deformed bole resulting from recurring fire injuries in the past.

FIG. 3.—A portion of the planting site east of the Deppe Tower, as it appeared after cutting and broadcast burning in 1936. The soil was so wet that planters experienced difficulty in keeping the seedlings from squirting out of the ground when closing the planting holes.

can compete with pond pine under varying degrees of drainage.

Procedure

The first plantings of loblolly and slash pine were made in the spring of 1936 under the direction of Dr. J. V. Hofmann, then head of the Forestry Department at North Carolina State College, now director emeritus of the School of Forestry and manager of the North Carolina Forestry Foundation. These plantings were located near Deppe Tower, on Highway No. 17, between Maysville and Jacksonville, on Bladen very fine sandy loam, and extended over 416 acres.

The general area where the plantings were made used to be one of the wettest of the forest (Fig. 3). However, in 1934 when Highway 17 was constructed, a canal was dug along the west side, and also a ditch was dug along Deppe Trail, which runs at right angles to the highway. Both the canal and the ditch helped the drainage on portions of the area that were subsequently planted.

Preparation of the planting site consisted of cutting the scattered pond pine and broadcast burning the brush and slash. Planting was done by the Civilian Conservation Corps crews, using a spacing of six feet for both loblolly and slash pine.

Simultaneously with the 400-acre general planting at 6-foot spacing, a test of several plantation spacings was also initiated. This "show window" planting consisted of 22 one-acre plots located at Deppe Tower, west of Highway 17, and both north and south of Deppe Trail. The individual one-acre plots were planted at exact spacings of either 4 x 4 feet, 6 x 6 feet, or 8 x 8 feet. Permanent ¼-acre plots were established in the centers of nine of these plots, six of them in loblolly pine and three in slash pine. All trees within these ¼-acre plots were identified individually by metal tags, and they have been measured periodically to determine rate of diameter growth.[3] The latest of

[3]The authors are deeply indebted to Dr. J. V. Hofmann under whom the

these measurements was made in the spring of 1955 when the trees were 19 years old. The 1955 data is used here to indicate how well loblolly and slash pine are developing on pocosin land that has been modified by drainage. Volumes were obtained from tables in MacKinney and Chaiken[4] and U. S. Forest Service.[5]

Results and Discussion

Both species have shown satisfactory growth and development without any major differences between species (Table 1). At 19 years, average stand d.b.h. was approximately six inches, with maximum within-plot range of 2 to 12 inches. Average merchantable volume of peeled wood in trees 5 inches d.b.h. and larger was slightly more than 20 cords per acre, mean annual growth being better than one cord per acre. This estimate is probably a conservative one of potential growth, since nine years elapsed before the plantations began to produce merchantable material, and the period of rapid volume growth, or culmination of mean annual growth, is largely in the future.

The different spacings have exerted an important influence on growth and development of the stands (Table 2). The number of trees per acre 8 inches or larger in d.b.h. is one and one-half times greater in the 8 x 8 foot spacing than in the 6 x 6 foot spacing, and nearly four and one-half times greater than in the 4 x 4 foot spacing.

Although the number of larger trees was found to be clearly greater at the wider spacing, both total and merchantable volume was higher in the 6 x 6 feet spacing (Table 3). The time of weeding may have affected this outcome. All nine growth plots were weeded in 1944-45 to remove hardwood brush and volunteer pond pines. At that time it was quite evident that weeding, delayed by World War II, should have been made several years earlier because the invading pond pines had already grown so large that they were seriously crowding the planted loblolly and slash. The invaders had attained largest size in the 8 x 8 feet plots, and it is believed that they had caused the greatest reduction in diameter and basal area growth of the planted pines at this spacing.

As might be expected, mortality

TABLE 1.—AVERAGE SURVIVAL AND GROWTH OF LOBLOLLY AND SLASH PINE IN THE HOFMANN FOREST PLANTATIONS AT DEPPE TOWER, ALL SPACINGS COMBINED

	Loblolly pine	Slash pine
Average survival in percent	63	59
Average d.b.h. in in.	5.9	6.0
Average height in ft.	42	47
Average basal area per acre in sq. ft.	181	177
Average total peeled volume per acre, cu. ft.	2,855	2,828
Average merchantable peeled volume per acre in trees 5 inches d.b.h. and up in cu. ft.	2,030	2,132
Mean annual growth of merchantable wood in peeled cords per acre	1.1	1.2

TABLE 2.—NUMBER OF TREES PER ACRE BY DIAMETER CLASSES AND SPECIES, AND AVERAGE DISTRIBUTION OF TREES BY SPACINGS FOR BOTH SPECIES COMBINED IN THE HOFMANN FOREST PLANTATIONS AT DEPPE TOWER

Species	Spacing	D.b.h. class—inches 2	3	4	5	6	7	8	9	10	11	12	All diameters
		Number of trees per acre											
Loblolly	4'x4'	....	44	304	344	284	148	44	12	....	....	....	1,180
Loblolly	4'x4'	8	176	464	348	284	80	8	....	....	....	....	1,368
Slash	4'x4'	....	100	316	368	256	136	48	16	4	....	....	1,244
Ave., both species		3	107	361	353	275	121	33	9	1	....	....	1,264
Loblolly	6'x6'	....	8	92	160	252	216	132	8	8	....	....	876
Loblolly	6'x6'	8	24	116	244	272	132	76	8	....	....	....	880
Slash	6'x6'	12	52	96	212	192	128	84	36	16	....	....	828
Ave., both species		7	28	101	205	239	159	97	17	8	....	....	861
Loblolly	8'x8'	4	8	36	56	128	116	168	44	20	4	....	584
Loblolly	8'x8'	8	28	92	72	164	120	96	48	4	....	4	636
Slash	8'x8'	8	8	36	92	88	88	92	52	20	20	4	508
Ave., both species		7	15	55	73	127	108	119	48	15	8	3	576

TABLE 3.—AVERAGE SURVIVAL AND GROWTH BY SPACINGS FOR THE HOFMANN FOREST PLANTATIONS AT DEPPE TOWER, BOTH SPECIES COMBINED, AT 19 YEARS AFTER PLANTING

	4'x 4'	6'x 6'	8'x 8'
Average survival in percent	51	75	85
Average d.b.h. in in.	5.3	6.1	6.9
Average height in ft.	45	43	43
Average basal area per acre in sq. ft.	207	184	148
Average total peeled volume per acre in cu. ft.	3,196	3,118	2,325
Average merchantable peeled volume per acre in trees 5 inches d.b.h. and up, cu. ft.	2,008	2,308	1,876
Average merchantable volume per acre in peeled cords	21.3	24.3	19.4
Mean annual growth, peeled merchantable wood, in cords per acre	1.1	1.3	1.0

TABLE 4.—GROWTH OF LOBLOLLY PINE, AT 6 x 6 FEET SPACING, IN RELATION TO DISTANCE FROM HIGHWAY 17 CANAL, 17 YEARS AFTER PLANTING

Distance from canal	Average d.b.h.	Average height	Yield per acre	Mean annual growth per acre
Feet	*Inches*	*Feet*	*Cubic feet*[1]	*Cubic feet*[1]
170	5.9	41	2,812	165
430	5.0	29	1,430	84
680	4.6	29	934	55
Not drained	3.0	17	199	12

[1]Volume of peeled wood in trees 4 inches d.b.h. and over.

study was initiated and to Professor G. K. Slocum and students of the North Carolina State School of Forestry who assisted in the establishment and subsequent measurement of the study plots.

[4]MacKinney, A. L., and L. E. Chaiken. Volume, yield, and growth of loblolly pine in the Mid-Atlantic Coastal Region. Tech. Note No. 33, Appalachian Forest Expt. Sta. 1939.

[5]U. S. Forest Service. Volume, yield, and stand tables for second-growth southern pines. U. S. Dept. of Agric. Miscel. Publ. No. 50. 1929.

FIG. 4.—Interior of one of the 6 x 6 foot spacing plots within 200 feet of the Highway 17 canal. Close spacing has resulted in a high proportion of clear stems, but crowding at this stage is excessive and crowns are short. However, diameters are amply large to permit a commercial thinning. (Photo taken June 23, 1956, approximately 21 growing seasons after planting.)

FIG. 5.—*Right:* Close-up of drained plantation. *Left:* Close-up of plantation not drained.

has been lowest (15 percent) in the widest spacing, in contrast to the 4 x 4 feet spacing where almost half the trees have died within 19 years after planting. Even in the 6 x 6 feet spacing where average mortality has been 25 percent, crowding is already severe and crowns are getting too short (Fig. 4). However, there are enough large trees in the stands to provide an operable thinning.

The early Hofmann Forest plantations are also providing some preliminary information on the importance of adequate drainage for transforming pocosins into productive wood-producing areas. Measurements were taken on a series of random tenth-acre plots in loblolly pine, spaced 6 x 6 feet, when the trees were 17 years old, to determine the rate of growth at different distances from the Highway 17 canal of Deppe Tower. Similar plots were measured in a portion of the plantation, across the highway and railroad, the embankments of which formed a barrier to drainage (Figs. 5 and 6).

The effect of drainage is quite striking. Within 200 feet of the highway canal, the loblolly has been growing at the rate of approximately 2 cords per acre per year (Table 4). The big question, still unanswered, is: Will drainage prove profitable? The answer to this question is being sought through continuing studies on the Hofmann Forest. The data reported in Tables 1 to 3 and in Table 4 were obtained from plots within ⅛ mile of the Highway 17 canal, from land that had not been specifically provided with lateral drainage. Under this circumstance, it appears that somewhere between 500 and 600 feet from the canal the productivity of this 19-year-old plantation falls below the cord-per-acre-per-year level. Even this level of production is still much better than in the plantation portions not drained, where growth has not exceeded ⅛ to 1/7 cords per acre per year. And, again, it should be remembered that at age 19, the culmination point for mean annual growth has not yet been reached. Studies of water table behavior on

FIG. 6.—Hofmann Forest headquarters at Deppe Tower, with part of drained plantation at upper right, and part of undrained plantation across the highway and railroad at upper left.

the Hofmann forest are indicating that major ditches or canals may affect water levels to distances of at least ¼ mile in areas with more drainable soils. These tests together with the preliminary growth information on slash and loblolly give promise that planting pines in pocosins may prove to be a profitable venture.

Summary

1. Planting of loblolly and slash pine on the Hofmann Forest in Jones and Onslow Counties, North Carolina, was undertaken in the spring of 1936.

2. A general planting of 416 acres of 6 by 6 feet spacing was made, together with 22 one-acre plots at exact spacings of 4 by 4 feet, 6 by 6 feet, and 8 by 8 feet, on Bladen very fine sandy loam, averaging one foot of dark gray to black surface soil.

3. Two plots of each spacing in loblolly pine and one of each in slash pine have been measured for diameter and height growth to determine volume production on these pocosin sites.

4. Both slash and loblolly pine have shown satisfactory growth, averaging over 1 cord per acre per year.

5. Spacings have exerted an important influence on the proportion of large trees, there being only 43 trees per acre over 8 inches in d.b.h. on the 4 x 4 foot plots in contrast to 122 trees per acre on the 6 x 6 foot plots and 193 trees per acre on the 8 x 8 foot plots.

6. Within 200 feet of the drainage canals, growth has been about 2 cords per acre per year, in contrast to only about $^1/_7$ cord per acre on areas not drained.

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Notes

Some Statistical Aspects of County Forest Inventorying In the Tennessee Valley

In 1950 the Division of Forestry Relations of the Tennessee Valley Authority began a series of forest inventories designed to provide reliable information with the county as the survey unit. Through June 1956, 36 of the 125 Valley counties had been inventoried (Fig. 1). Initial surveys of the remaining counties are scheduled for completion by about 1962.

Data from these surveys are used extensively by forest products industries, railroads, state forestry divisions, state and county planning groups, chambers of commerce, and the many other local agencies concerned with forest resource development and watershed protection. These initial inventories will also serve as benchmarks for measuring changes in forest conditions and thus facilitate future assay of forestry program accomplishments or needs at the county level.

In a recent study,[1] several aspects of TVA's forest sampling experience in 25 of the county surveys were investigated in an attempt to improve techniques. Some 3,750 measurements of gross merchantable sawtimber volume[2] on 0.2-acre sample plots (the variate y) were analyzed by statistical methods to: (1) compare sample county coefficients of variation and sample means; (2) determine the relative precision of stratified (geographic stratification) and simple random sampling; (3) define the typical distribution of the variate y within a county and gauge several effects of non-normality upon the reliability of sample estimates of the mean and the standard deviation; (4) explore a possible method of predicting variation in sawtimber volume.

The study also considered (5) reliability of certain cubic-foot volume estimates and classified forest area proportions and (6) the precision of 0.1-acre and 0.01-acre plots for estimating number of pole-size trees. Only phases (1) and (2) are discussed here.

[1]The study was reported in June 1956 as a master's thesis at the University of Tennessee, Knoxville, Tenn.

[2]Merchantable sawtimber volume includes live trees which will yield at least one 8-foot butt log or at least 50 percent of their gross board-foot volume in sound sawlogs; minimum tree diameters (at breast height) are 9 inches for softwoods and 11 inches for hardwoods. Board-foot volumes are expressed in the International ¼-inch rule; minimum sawlog diameters (inside bark) are six inches for softwoods and 8 inches for hardwoods.

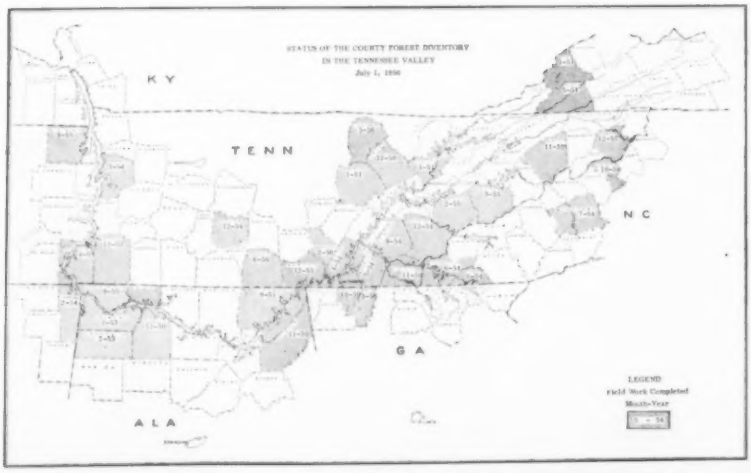

FIG. 1.—Status of the county forest inventory in the Tennessee Valley, July 1, 1956.

Sample Design

The basic plan for each county forest inventory required that total merchantable sawtimber volume be estimated within ± 15 percent, with 90 percent confidence (or approximately ± 9 percent with 68 percent confidence).

The initial step was to determine the total commercial forest acreage (universe size, or N) from aerial photographs or from previous survey data. This universe was divided into L geographic strata of equal size N_h. Within each stratum an equal number n_h of observations or sample plots were randomly located on field maps, using a template and a table of random numbers.

This specialized case of stratified random sampling has a number of advantages:

1. Mechanical location of plots within the sampling frame is simple.

2. Relatively uniform dispersion of plots is achieved throughout the county. This feature aids in mapping forest types. Also, the pattern of plots is more acceptable to the non-statistician than simple random sampling.

3. Variances are theoretically easier to estimate than for the systematic sample, and computations

are less time-consuming, especially when $n_h = 2$.

4. Usually the stratified sample is more precise than the simple random sample; i.e., variance for the estimated mean is smaller.

Sample Size and Sampling Errors

To compute the sample size that will give merchantable sawtimber estimates within ± 9 percent with 68 percent confidence, it was necessary to predict the variances s_y^2 of this variate y.[3] Table 1 summarizes sample coefficients of variation and sample means computed from 25 surveys—each a 150-plot sample. Considerable heterogeneity is apparent among the statistics. Better variance prediction could lead to more efficient sampling and this problem is worthy of further research.

Table 1 also shows that sample size 150 provides reasonable sampling errors, ranging from 12.5 percent for Clay County, North Carolina to 7.5 percent for Anderson County, Tennessee. The median error, 9.3 percent for Hardin County, Tennessee practically meets the desired survey standard. Sawtimber sampling errors as high as a 12.5 percent are not considered excessive for such surveys. Furthermore, accompanying estimates such as total cubic volume of merchantable timber will have lower errors.

Stratified Versus Simple Random Sampling

Table 2 compares for ten county surveys sample variances of the mean estimated by (1) stratified random formula and by (2) ignoring stratification and using a simple random formula. The data show slight precision losses for eight of the ten surveys (i.e., relative precision exceeded 1.00) when stratification was ignored. Only in the Hardin and McMinn County surveys did the reverse occur. However, since stratification was purely geographical, large gains in precision were not anticipated. On the other hand, construction of the frame and location of the sampling points was substantially expedited.

WILLIAM H. OGDEN
Division of Forestry Relations, Tennessee Valley Authority, Norris, Tennessee

TABLE 1.—SAMPLE COEFFICIENTS OF VARIATION AND MEAN GROSS MERCHANTABLE SAWTIMBER VOLUME PER 0.2-ACRE UNIT FOR TWENTY-FIVE TENNESSEE VALLEY COUNTIES BY COUNTY, 1950-55

County	Sample coefficients of variation[1]		Mean volume[2] (0.2-acre unit)
	$s_y/\bar{y}$	$(s_{\bar{y}}/\bar{y})100$	$\bar{y}$
		± *Percent*	*Board feet*
Clay, North Carolina	1.53	12.5	685
DeKalb, Alabama	1.39	11.3	444
Tishomingo, Mississippi	1.35	11.1	327
McMinn, Tennessee	1.30	10.6	433
Mitchell, North Carolina	1.29	10.6	737
Bradley, Tennessee	1.26	10.3	309
Sevier, Tennessee	1.23	10.0	417
Humphreys, Tennessee	1.19	9.7	264
Cumberland, Tennessee	1.18	9.6	375
Bedford, Tennessee	1.16	9.4	372
Scott, Virginia	1.16	9.4	547
Buncombe, North Carolina	1.15	9.4	828
Hardin, Tennessee	1.14[3]	9.3[3]	384
Cherokee, North Carolina	1.10	9.0	449
Greene, Tennessee	1.09	8.9	712
Wayne, Tennessee	1.04	8.5	194
Catoosa, Georgia	1.03	8.4	477
Monroe, Tennessee	1.02	8.3	635
Wise, Virginia	1.02	8.3	888
Polk, Tennessee	1.01	8.2	747
Hamilton, Tennessee	1.00	8.2	441
Morgan, Tennessee	0.96	7.9	525
Lawrence, Alabama	0.95	7.7	611
Blount, Tennessee	0.91	7.5	541
Anderson, Tennessee	0.91	7.5	912

[1] s_y = sample standard deviation; $s_{\bar{y}}$ = sample standard error of mean; $\bar{y}$ = sample mean.

[2] Source: Data from 3,754 sample plot field schedules (TVA Form 5335) in the files of the TVA Division of Forestry Relations at Norris, Tennessee.

[3] Median coefficient.

TABLE 2.—RELATIVE PRECISION OF STRATIFIED RANDOM AND SIMPLE RANDOM SAMPLING FOR TEN TENNESSEE VALLEY COUNTY FOREST INVENTORIES, 1950-55

County	Estimated variance of mean[1]		Relative precision $(s_{\bar{y}ran})^2(s_{\bar{y}st})^2$
	Simple random $(s_{\bar{y}ran})^2$	Stratified random $(s_{\bar{y}st})^2$	
Clay, North Carolina	8615	7278	1.18
Blount, Tennessee	1802	1632	1.10
Cherokee, North Carolina	1787	1631	1.10
Anderson, Tennessee	5050	4643	1.09
Lawrence, Alabama	2438	2229	1.09
Tishomingo, Mississippi	1415	1311	1.08
DeKalb, Alabama	2654	2533	1.05
Buncombe, North Carolina	6217	6062	1.03
Hardin, Tennessee	1182	1267	0.93
McMinn, Tennessee	1792	2120	0.85

[1] Sample size n = 150 for each county.

[3] $s_y^2 = \sum_{h}^{L} \sum_{n_h} (y - \bar{y}_h)^2/(n - L)$ = a pooled estimate of the within-stratum variation; where y = a sample variate, $\bar{y}_h$ = sample mean of the h^{th} stratum, L = number of strata, n_h = number of sample variates per stratum and n = sample size for a stratified random sample. Cochran, William G. , Sampling techniques. John Wiley and Sons, Inc., New York. 1953, p. 72.

A Technique for Calculating Cubic Volumes in Butt Logs of Trees

Calculations of cubic-foot volumes in butt logs are often complicated by a taper condition known as butt swell. Spurr's[1] graphical procedure could be used in such cases since it is "applicable to all types of taper." His method is accurate and faster than the standard graphical procedure with a planimeter.[2] It is, however, still somewhat time consuming.

Another graphical approach, based on the suggestion by Bruce and Schumacher[3] that one of the paraboloid formulas be used with butt sections of very short length, seems to be equally accurate and much faster if a calculating machine is available. This approach is presented stepwise as follows:

1. Using taper measurements from the lower stem of a tree, plot distance above ground over diameter inside bark. The following set of taper measurements from a Douglas-fir tree will be used to illustrate this and subsequent steps:

Distance above ground	Diameter inside bark
Feet	*Inches*
2.5	16.2
12.5	13.2
22.5	12.2
32.5	10.2

2. Connect the plotted points with a smooth, free-hand curve. Extend this curve far enough past the top of the butt log so that measurements above the butt log will have their proper influence on taper in the butt log (Fig. 1).

3. Near this curve, record inside bark diameters at equal intervals from top of butt log to top of stump. In the example, a 2-foot interval, a 16-foot butt log, and a 1-foot stump were used.

4. Square the diameter recorded for the top of the log, add it to the square of the diameter at the base of the log and calculate the average of the two squared diameters.

$$[(12.7)^2 + (16.8)^2]\ [0.5] = 221.761$$

5. Calculate the sum of the squares of all recorded diameters except those for the top and the base of the butt log.

$$(12.9)^2 + (13.1)^2 + (13.5)^2 + (14.0)^2 + (14.6)^2 + (15.2)^2 + (16.0)^2 = 1416.47$$

6. Add the results from steps 4 and 5.

$$221.76 + 1416.47 = 1638.23$$

7. Multiply the result from step 6 by the factor $[(.005454)(I)]$ where I is the interval between successively recorded diameters on the curve.

$$(1638.23)(.005454)(2) = 17.87 \text{ cubic feet.}$$

This is an estimate of cubic-foot volume in the butt log.

If a calculating machine is available, steps 4 through 7 can be accomplished in a fraction of a minute with one smooth series of operations. These four steps automatically apply the Smalian formula to sections of butt logs and then add the section volumes. Although the result will be biased to the extent that tapers in these short sections fail to correspond to tapers in truncated paraboloids, the bias becomes smaller as section length is reduced. Lengths of 1 or 2 feet should be more than sufficient for most practical purposes.

The technique described here is not limited to butt logs. It can be applied to any other portion of a tree or to an entire tree.

A similar method developed by Grosenbaugh[4] and based on a Newton formula could also be used for estimating cubic volumes of trees and logs. However, this method appears to be somewhat less convenient. Application of the Newton formula by 4-foot sections to the example in Figure 1 gave an estimated butt log volume of 17.86 cubic feet as opposed to 17.87 by the method described in this report.

FLOYD A. JOHNSON
Pacific Northwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, Portland, Oregon

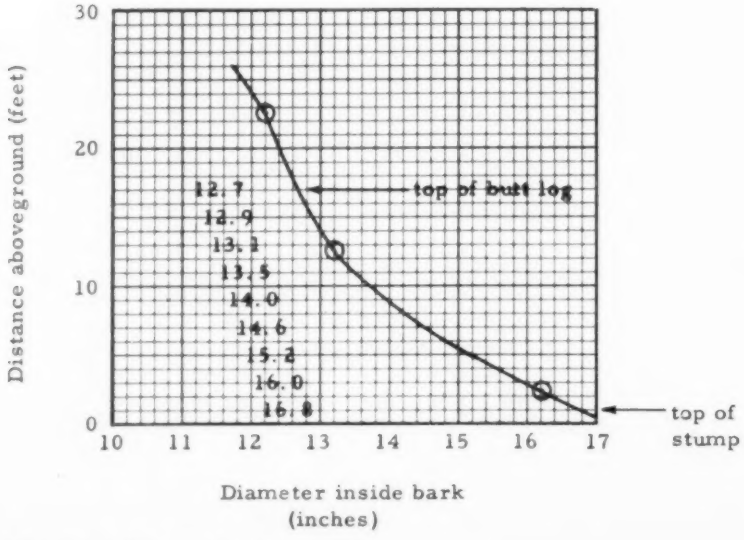

FIG. 1.—Butt log taper curve.

[1]Spurr, S. H. Forest inventory. 476 pp. Ronald Press Company, New York. 1952.

[2]Reineke, L. H. The determination of tree volume by planimeter. Jour. Forestry 24:183-189, illus. 1926.

[3]Bruce, D., and F. X. Schumacher. Forest mensuration. Ed. 3, 483 pp., illus. McGraw-Hill Book Co., Inc., New York. 1950.

[4]Grosenbaugh, L. R. Improved cubic volume computation. Jour. Forestry 46: 299-301. 1948.

A New Instrument for Measuring Forest Overstory Density[1]

A new instrument called a "spherical densiometer" has been described for estimating forest overstory density.[2] This pocket-type instrument employs a mirror with spherical curvature which makes possible the reflection of a large overhead area. A grid is used to estimate percentage of this overhead area covered with forest canopy. Estimation is usually from a point near the forest floor. Adequate sampling gives the average canopy of a forest area.

Two models, A and B (Figs. 1 and 2), have been adopted as standard. Each employs a highly polished chrome mirror 2½ inches in diameter and having the curvature of a 6-inch sphere. The convex side of the mirror is used in Model A and the concave side in Model B. Each has some advantages over the other.

The mirrors are mounted in small wooden recessed boxes with hinged lids similar to compass boxes. The over-all dimensions are about 3½ x 3½ x 1⅛ inches. A circular spirit level is mounted (recessed) beside the mirrors. Positive slide fasteners are provided in Model B which allow the lid to open to an angle of about 45 degrees.

Cross-shaped and circular grids with squares and dots are used to estimate overstory coverage by tree crowns. Grids are of two kinds: (1) those scratched upon the surface of the mirror, Model A, and (2) those superimposed between the mirror and the eye, Model B.

The cross-shaped grid scratched upon the convex surface of the mirror in Model A has 24 quarter-inch squares (Fig. 3A). Instructions for using the densiometer and cumulative values for the squares on the grid are shown on a chart that is attached to the inside of the box lid (Fig. 3B). It is easier and faster to estimate the relative amount of overstory coverage with this instrument by assuming the presence of four equi-spaced dots in each square and by counting dots representing openings in the canopy. The percentage of overstory density is then assumed to be the complement of this number. Each assumed dot is assigned a value of one percent in this case. A slight discrepancy exists between estimations using the squares and estimations by counting assumed dots, because there are only 96 dots in the entire grid area. Cumulative values of the squares shown in the chart add up to 100 percent for the entire area within the grid. If desired, one may calculate the exact percentage values for each assumed dot and thereby make the two methods of use exactly comparable.

Model B has a circular grid. The circle is 2½ inches in diameter superimposed over quarter-inch squares. Each square has four equi-spaced dots (Fig. 4A). This grid is made from a positive print of a photographic film mounted between thin sheets of plexiglass and fitted into the window of the box lid. Instructions for operating Model B are given on a chart mounted on the bottom of the instrument box (Fig. 4B). The operator estimates overstory density by counting the dots representing overstory openings and assuming this to represent the percentage of noncovered overstory area. Here again a slight discrepancy exists because there are only 96 dots included within the area of the circular grid. Exact percentage values for each dot may be calculated to estimate the entire circular area as 100 percent. This refinement is not considered necessary for ordinary use of the instrument.

Instruments can be developed with different kinds, sizes, and shapes of grids and with mirrors of different curvatures. However, standardization of these properties is necessary to provide comparable information that can be duplicated.

[1] *Editor's note.*—At the request of the author the reader's attention is called to the comercial availability of this instrument. See page 696.

[2] Lemon, Paul E. 1956. A spherical densiometer for estimating forest overstory density. Forest Sci. 2:314-320.

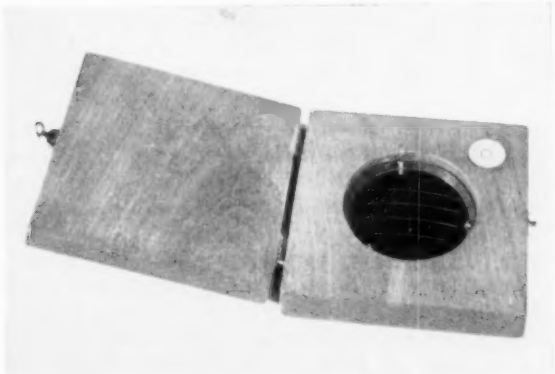

FIG. 1.—Spherical densiometer, Model A, with estimating grid scratched on the surface of the convex mirror.

FIG. 2.—Spherical densiometer, Model B, with estimating grid superimposed between the eye and the surface of the concave mirror.

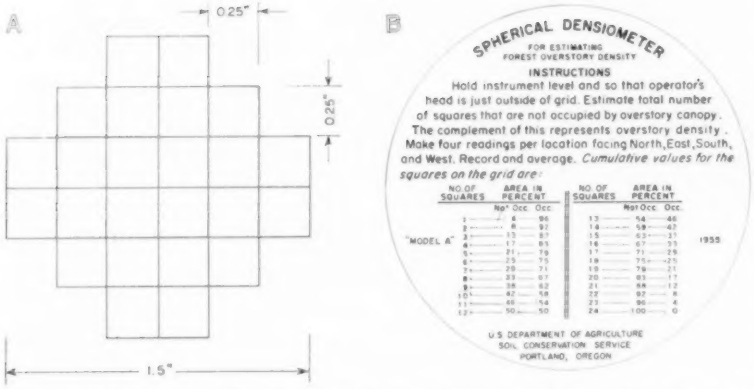
A
0.25"
0.25"
1.5"
B
SPHERICAL DENSIOMETER
FOR ESTIMATING
FOREST OVERSTORY DENSITY
INSTRUCTIONS
Hold instrument level and so that operator's head is just outside of grid. Estimate total number of squares that are not occupied by overstory canopy. The complement of this represents overstory density. Make four readings per location facing North, East, South, and West. Record and average. Cumulative values for the squares on the grid are:
NO. OF SQUARES
AREA IN PERCENT
Not Occ.
Occ.
"MODEL A"
1955
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PORTLAND, OREGON

FIG. 3.—(A) Cross-shaped grid scratched on the convex surface of the mirror in Model A. Each square is ¼ inch on a side. (B) Instructions for using Model A. This is fastened to the inside of the lid of the mounting box.

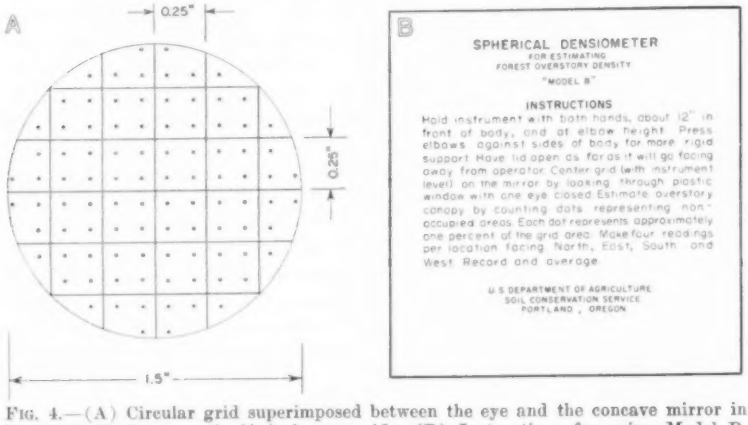
A
0.25"
0.25"
1.5"
B
SPHERICAL DENSIOMETER
FOR ESTIMATING
FOREST OVERSTORY DENSITY
"MODEL B"
INSTRUCTIONS
Hold instrument with both hands, about 12" in front of body, end of elbow height. Press elbows against sides of body for more rigid support. Have lid open as far as it will go facing away from operator. Center grid (with instrument level) on the mirror by looking through plastic window with one eye closed. Estimate overstory canopy by counting dots representing non-occupied areas. Each dot represents approximately one percent of the grid area. Make four readings per location facing North, East, South and West. Record and average.
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PORTLAND, OREGON

FIG. 4.—(A) Circular grid superimposed between the eye and the concave mirror in Model B. Each square is ¼ inch on a side. (B) Instructions for using Model B. This is fastened to the bottom of the mounting box.

The instruments described have been thoroughly tested and have given satisfactory results with most western conifers. We believe the spherical densiometer described (either Model A or B) will serve the needs of practicing forester, range conservationist, and plant ecologist or those of most scientists doing highly technical work.

Operators need a little training to become consistent in the use of the instrument. Judgment and experience is needed to differentiate between overstory areas that are considered completely covered by the overstory and those that have thin but uniformly distributed coverage. In the latter case it may be necessary to estimate the area of many small irregular openings and reduce the percentage overstory density by the sum of these. Training and experience are needed for each different forest species or type because of the differences in overstory characteristics. The season of the year is important when making measurements in forests containing deciduous species.

Experience has shown that sufficient accuracy can be attained with the spherical densiometer by holding it as nearly level as possible in the hand. This is made possible by installing a circular spirit level in the mounting box. No mechanical support, such as a tripod, is needed. This adds to the practicability of the instrument in use.

A large number of measurements of overstory density have been made to test the instrument. One such study involved the measurement of overstory density at points in 28 different forests. Measurements were made at each point by four different operators each using instrument Model A and Model B. The results were subjected to an analysis of variance to determine consistency of measurements. There were no significant differences among measurements made by different operators or with different instruments and none of the interactions were significant. The differences due to forests, however, were highly significant—above the 99 percent level of probability. Under similar conditions one can expect variations in overstory density measurements to be within ± 1.3 percent, ± 2.4 percent, and ± 3.1 percent at probability levels of 70, 95, and 99 percent respectively. These variations amount to about 2, 3, and 4 percent when the standard deviation is expressed in terms of the overstory at the point of measurement (coefficient of variation).

Another study involved placement of 416 different forest overstory measurements into 5 percent overstory density classes. Variation around the mean within each class was calculated and the standard deviations and coefficients of variation plotted against the overstory density classes. It was found that variation among measurements increased as the overstory being measured decreased—only slightly when overstory density decreased from 100 down to about 60 percent but rapidly thereafter. When placing overstory density into 5 percent classes with the spherical densiometer, reliability in the order of about 5 percent can be expected so long as one is measuring forests that have more than about 50 percent overhead canopy. Since one naturally estimates percentage of overstory area *not* covered in dense forests and overstory area *covered* in open forests, estimations of overstory density when placed in classes will seldom vary more than ± 5 percent.

Loss in reliability of overstory density measurements results from

placing forests in overstory density classes based on measurements with the spherical densiometer as contrasted with using the actual measurements. For instance, reliability of about ±1.3 percent can be attained when actual measurements are used whereas the reliability is reduced to about 5 percent when classes are used.

PAUL E. LEMMON
Soil Conservation Service,
U. S. Department of Agriculture,
Washington, D. C.

Pruning-Wound Closure on Southern Red Oak

In an effort to obtain good-quality growth as soon as possible in an upland oak stand in southeast Arkansas, the trees were pruned to a height of 16 feet with a pole saw and above that with a ladder and handsaw. On each of three plots ten pruned trees were selected at random for detailed measurements of various features, including pruning wound. In all, 98 wounds were measured immediately after pruning and tagged and numbered for future observation.

The sample trees were southern red oaks (*Quercus falcata* Michx.). They averaged 6.4 inches d.b.h. when pruned. Five years later they measured 7.4 inches, having grown at an average rate of 0.20 inch per year.

Table 1 shows wound size and condition immediately following pruning. The original wounds averaged 1.2 inches in diameter and ranged from 0.4 to 3.6 inches. Wound size was determined by measuring vertical and horizontal dimensions to the nearest tenth inch and averaging them. Over 69 percent of the original wounds were sound. Those with incipient rot or advanced rot (as determined by surface appearance or probing with a sharp instrument) were usually in the lower portions of the bole where dead limbs and stubs were prevalent.

TABLE 1.—WOUND STATUS IMMEDIATELY FOLLOWING PRUNING

Plot	Wounds measured	Average wound size	Condition			
			Sound	Incipient rot[1]	Advanced rot[1]	Total
	Number	*Inches*	*Percent of wounds*			
A	32	1.2	65.6	21.9	12.5	100.0
B	34	1.2	73.5	14.7	11.8	100.0
C	32	1.3	68.8	18.7	12.5	100.0
Average		1.2	69.4	18.4	12.2	100.0

[1]Found in wounds resulting from pruning dead limbs and stubs.

TABLE 2.—WOUND STATUS FIVE YEARS AFTER PRUNING

Plot	Wounds closed	Wounds still open	Average wound size	Condition of open wounds			
				Sound	Incipient rot[1]	Advanced rot	Total
	Percent		*Inches*	*Percent of wounds*			
A	90.6	9.4	0.5	33.3	66.7	0.0	100.0
B	76.5	23.5	.5	100.0	0	0	100.0
C	87.5	12.5	.5	25.0	75.0	0	100.0
Average	84.7	15.3	.5	66.7	33.3	.0	100.0

[1]Five wounds were recorded in this class. All but one had decay at the beginning of the test.

Wound status five years after pruning is given in Table 2. Almost 85 percent of the wounds had healed over completely. The healed wounds originally ranged from 0.4 to 3.0 inches in size. A little over 15 percent of the wounds were still open, but they now averaged only 0.5 inch in size, with extremes of 0.2 to 0.8 inch. The largest wound recorded on this study originally measured 3.6 inches. It was still open but had been reduced to 0.6 inch, and was sound. The tree which bore it had grown 0.28 inch in diameter per year.

Poor diameter growth usually resulted in slow healing. A wound originally measuring 1.2 inches on a tree with a yearly diameter growth of 0.14 inch was still 0.8 inch in size five years after pruning.

Two-thirds of the open wounds proved to be sound while the remaining third showed incipient rot. All but one of the open wounds which were originally sound were still free from decay. There was no evidence that originally sound pruning wounds of the sizes studied served as an important entrance for rot in southern red oak.

CHARLES X. GRANO
Southern Forest Experiment Station,[1]
Forest Service,
U. S. Department of Agriculture

[1]In cooperation with The Crossett Company, Crossett, Arkansas.

Points of View

Let's Reconsider the Purpose of the Division of Forest Economics and Policy

At the Annual Meeting of the Society at Biloxi, Mississippi, in 1951 the business session of the then Division of Forest Economics adopted a resolution requesting the Council to change the name of the group to the Division of Forest Economics and Policy. According to the report of that meeting carried in the JOURNAL, some twenty members of the Division were in attendance at the time the resolution was adopted. Details of the resolution, including the reasons for the suggested change, do not appear to have been publicized among members of the Division. The Council approved the request for change in name at its next meeting and the Division has since operated as the Division of Forest Economics and Policy.

Five years of experience with programs of the Division has raised the question of the appropriateness and wisdom of the present title. Consideration of the matter at the Memphis Meeting in 1956 (reported on p. 64 of the January 1957 JOURNAL) resulted in the introduction of a motion to delete the words "and Policy" from the Division's name, and agreement to solicit full discussion of the question from the membership at large prior to any action on the matter by the Division's Executive Committee. In the interest of such discussion, the following views are offered in support of restoring the name of the Division to its original form—the Division of Forest Economics.

A central reason for reverting to the title Division of Forest Economics is that neither this Division nor any other divisional group has any claim to exclusive interest in matters of forest policy. Policy questions are for the Society, not just one Division. Thus forest policy is clearly one of the areas of subject matter appropriate for General Sessions of the annual meeting. Indeed, any well rounded discussion of policy should include expressions from all points of view and the General Sessions are the only ones where, under present conditions of annual meeting programming, such widespread representation in discussion can be obtained. To make policy discussions the *particular* responsibility of a single Division tends to subordinate the true importance of policy questions and leads to conflicts for those members with legitimate and strong interests in policy whose divisional interests center elsewhere than on forest economics.

By changing back to a Division of Forest Economics the way would be open to placing full dress discussions of issues of forest policy in the General Sessions where they belong. At the same time the Division of Forest Economics would again be free to consider particular policy implications of forest economics subject matter (just as every other Division is free to do), without the compulsion to present a carefully balanced discussion of policy as such. From the standpoint of the Division's programs, such a change would be most helpful as the present arrangement places programming officers on the horns of a dilemma. If a given policy issue is to be fully discussed with appropriate representation of different viewpoints, much that is non-economic must be introduced into the program and the discussion must inevitably get far removed, at times, from the economic considerations which have been the subject matter basis for the Division. Such breadth is entirely appropriate for General Sessions. But it undermines the very purpose for which subject matter Divisions are established—that of focussing sharp attention on particular aspects of professional forestry practice and research which are of special interest to limited and identifiable groups within the membership of the broader Society. Thus, to the extent that the Division serves as an acceptable forum for policy discussion, it is diverted from the task for which it has unique responsibility—that of fostering development of the forest economics field.

When, as has happened, the Division program confines presentation and discussion to *economic* aspects of policy, the policy issue is unlikely to receive the full and well rounded consideration which it merits. In the context of a Division of Economics this does no harm, as it is understood by all

Note to readers:

At its business meeting in Memphis, the Division of Forest Economics and Policy requested its executive committee to take appropriate action to have the Division renamed the Division of Forest Economics. These two papers, prepared at our request, indicate a number of major arguments for and against the proposal. But what is your opinion?

Before taking further action we would like to benefit from the opinions of interested members of the Society. Please send us your comments prior to October 15, 1957.

CARL H. STOLTENBERG, *Chairman*
Executive Committee,
Division of Forest Economics
and Policy,
102 Motors Avenue,
Upper Darby, Pennsylvania

concerned that economics includes only one range of the spectrum of considerations influencing policy. But within a Division of Forest Economics and Policy such a one-sided discussion is both inappropriate and often embarrassing. The economist who presents a paper is entitled to present his policy conclusions but the dissenter from such conclusions is likely to claim (with justice) that many other aspects of the policy problem have been ignored. That this dilemma is a real one has been evident in the programs of the Division during recent years.

In 1951 (when the Division of Economics title still prevailed) the program dealt heavily with policy. At the four annual Division meetings which have been held subsequently policy issues were given a central position on only two programs. In the others, policy questions were either not relevant to the program or were introduced more or less in passing by individual speakers addressing themselves to particular economic developments. Thus the change in name does not appear to have contributed greatly to stimulating interest in policy matters, nor has it resulted in completely satisfactory discussion of the limited number of issues that have appeared on the several programs.

At times it has been stated that a strong reason for including "Policy" in the divisional title is that more people will attend a policy discussion than will attend an economic discussion. This argument appears to be unsound. Since the change in name was adopted attendance figures do not support the contention. Attendance at the Division of Forest Economics and Policy meeting in 1953 was little larger than attendance at the Division of Economics meeting two years earlier. (No Division meeting was held in 1952). Moreover, it is hard to believe that members decide what meetings to attend on the basis of Divisional titles. Surely virtually all members base attendance on the titles and personages appearing on the several programs. If a Division arranges an attractive program of titles prepared by stimulating speakers, it will secure good attendance regardless of its name. It would seem that a Divisional structure should be based on how a group may best contribute to proper growth and development of the various technical aspects of the profession, not on the basis of competing for attendance at annual meetings by means other than the interest of the specific program which is offered.

In view of these considerations, let's revert to the name Division of Forest Economics. If we do so, economists and others will be as free as ever to discuss policy questions and policy implications of economic analyses. But both speakers and officers will be freed from the pressure arising out of the Division's present name either to develop programs of a breadth more suited to General Sessions or to lay themselves open to the charge of one-sided policy discussions.

HENRY J. VAUX

Let's Not Divorce Economics and Policy

The question of the Division's purpose and name, though perhaps of liveliest concern to the Division's most active participants, should be decided in the interest of the Society of American Foresters as a whole. In the judgment of the undersigned past chairmen of the Division, the present purpose and name serve the Society best by helping to keep the Division progressive and realistic. The proposed change would, we believe, run against the interest of the Society.

1. To be sure, almost every forester is concerned with policy. But most foresters are concerned with economics, too. It is just as appropriate to grant divisional status to the one field as to the other.

2. There are a great many members of the Society who have a special interest in policy, not just policy in the large, but policy in close relation to economics. And after all, it might as well be faced that in Twentieth Century America economic considerations are in the last analysis the chief basis for policy, private and public.

3. The many members of our professional Society who have this pointed interest in policy-and-economics should not be discouraged from making an appropriate divisional affiliation. That they have sought it in the Division of Forest Economics and Policy is clear from such evidence as the substantial interest listings in our Society Directory.

4. The answer to appropriate divisional affiliation for policy people is not a separate Division of Policy. Creating such a division would worsen, not lighten, the problem of program scheduling and conflicts at the annual meetings. The Society stands to gain by consolidating, not atomizing, divisional interests, and even by further encouraging joint divisional meetings such as Forest Economics and Policy has held nearly half of the time.

5. Furthermore, to encourage a withdrawal of economics from the policy group would be to weaken the former gravely. Economics—as its older name, "political economy," signifies—is oriented primarily to policy. The main function of forest economics is to help solve problems for people—to help give the basis for their policy. The policy group in the Society comprises the users, the customers, of forest economics. Take them away and there will be left a division

made up of curve-benders and who-are-we philosophers. The Society has put up with enough of this sort of thing from its forest economists. It needs now to help them consolidate their maturity and tackle real problems.

6. Our personal observation is that when the policy group was beckoned into the Division in 1951 by means of the name change, the result was greatly to vitalize the Division. The statistics seem not to contradict this observation. Previously, emphasis on policy in the Division's meetings had been slight. Subsequently, half of the meetings have centered on policy, and attendance has passed the 100 mark and last year reached 350. We have noticed no particular dilemma in the planning of these increasingly lively meetings.

7. The meetings of the Division that attempt to examine policy critically and objectively fulfill quite a different purpose from those general sessions which examine policy. The outstanding feature of the former is that they permit and encourage floor discussion, for which there is little opportunity in general sessions. It is in the interest of the Society to make specific provision for floor discussion of policy.

8. Nor need there be conflict between general and divisional programs because of subject coverage. We have never observed general-session speakers skirting economic matters because there was a subject division in this area. We question if it would enter anyone's head to avoid policy matters because the term appears in the title of a division. Last year the final speaker in the general session gave a brilliant paper on the topic of timber utilization. In doing so, he contributed much to the benefit of the Society and was apparently quite undisturbed by thoughts of the Division of Forest Products meeting that was to come next day. General sessions should be just that, freely running the gamut of forestry subjects including, but not invariably emphasizing, policy. Their strength and unique purpose lie in their breadth of view over all these subjects.

9. If a Division's affairs were determined solely by the topics and speakers at its annual meetings, then the question of name might be minor. But the fact is that the name greatly affects the Division's life by implying its scope and by shaping the group of active participants who sustain the Division between meetings, staff its committees, and influence its continuing programs. We believe that the proposed change of name, coming as an exact reversal of constructive and beneficial action taken in 1951, would be confusing and discouraging to many of our Division's participants. We believe that the proposed change would be particularly unfortunate in carrying to them the implication that our Division was divorcing itself from considerations of policy and thus very possibly turning its back on reality. We believe that the greatest benefit to the forestry profession and to the Society of American Foresters from our Division will be gained under its present title of Forest Economics and Policy.

WILLIAM A. DUERR
LEE M. JAMES
CHARLES H. STODDARD
EUGENE V. ZUMWALT

Basic Research in the Biological Aspects of Forestry

"We can't bother with *basic* research; answers are what we need."

"Without *basic* research we might as well close up shop."

"We are letting him do *basic* research so don't expect too much in way of results."

"My work isn't very *basic*. All I do is field studies."

"You ivory-towered characters—always spouting off about *basic* research!"

Interesting viewpoints, whether you agree or not, but how has such a divergence of opinion developed? Each of the five men who so expressed themselves are competent, intelligent foresters and actively engaged in research. I can think of only one answer: the expression basic research must have more than one connotation. If this is so, is it not time to discuss what we mean by basic research? True, more confusion may be the initial development. However, eventual clarification should be possible; and to this end I would like to express the following opinion.

Basic research is research which is oriented toward determining *why* and is synonymous with fundamental research. The competence of the researcher, his background, his equipment, and where or how he works is irrelevant.

Although knowledge of plants has been organized at several different levels—the cell level, the tissue level, the organ level, the individual level, the population level, and the community level—the organizational level in itself does not determine what kind of research is involved. Tissues are made up of cells, organs are made up of tissues, and individuals are made up of organs. But this does not mean the researcher studying the cell is doing more basic research than the researcher studying the individual as a whole. Furthermore, because an investigator is working with something tangible, such as the components of the plant cell, does not mean he is necessarily doing basic research. Conversely because an investigator is working with an abstraction, such as the plant community, does not mean he is necessarily doing non-basic research. Field plots and blue jeans, greenhouses and green thumbs, test tubes, microscopes, bad smells, and white coats—none of these can be used to indicate basic or non-basic research. The only criterion is whether the in-

vestigator is involved in an attempt to determine why.

It is entirely possible that if the identical study were undertaken by two investigators, one would be carrying on basic research while the other would not. For example, suppose two investigators were studying the chemical constituents of five hardwood species, one of which was resistant to decay. Then suppose that both investigators found that the decay resistant hardwood contained a large quantity of substance X in the ray parenchyma, while the other four hardwoods did not. Suppose further, that both investigators identified this substance and reported their findings in the same scientific journal. Now, if the first investigator undertook the study because he was a "cataloger" of chemical compounds found in wood, and if the second investigator undertook the study, because he was interested in why one of the hardwoods was resistant to decay, then the first investigator was involved in non-basic research while the second investigator was involved in basic research. Had the second investigator been under contract to find some decay resistant substance for treating fence posts he would still be involved in basic research, as long as his approach was not changed. This would be true even though his findings were immediately useful and quoted as an example of applied research.

Applied research should not refer to a specific kind of research, but to the applicability of the results to a present day operational problem. If the state of the art—the stuff in textbooks and the "know-how" of the forest manager—is already well developed, there are many opportunities for non-basic research. For example, we know today that we can root cuttings of many plants if we treat them initially with I.A.A. Therefore, should we want to develop an operational system for vegetatively propagating a tree with desirable genetic characteristics, we might treat a series of cuttings with different concentrations of I.A.A. and wait for the roots—thus non-basic research. Then, if at one or more concentrations of I.A.A., the cuttings rooted, we would have successfully completed research which had immediate application and would call it applied research.

But what happens when the cuttings do not root? Then one has a choice of either trying more concentrations and more chemicals from the laboratory or kitchen shelf, or of trying to find out why this species responds differently than other species that can be successfully rooted—thus basic research. If we are successful in obtaining an answer and apply this information toward developing a successful rooting system, it then also becomes applied research.

Thus, when the state of the art is ahead of application, non-basic research can pay big dividends and is generally accepted as a synonym for applied research. On the other hand, when the state of the art is poorly developed, basic research must assume the role of applied research, if the research effort is to be successful.

In conclusion, it would appear to me that all research efforts should be critically examined to determine whether the state of the art is advanced to the extent that non-basic research can be justified. In view of the few people, by actual count, engaged in forest research, *non-basic* research appears to be a luxury we can ill afford. Most of the low apples on the tree have already been picked; from now on we have to reach.

EDWARD C. STONE
School of Forestry, University of California

Reviews

Flat Top Ranch: The Story of a Grassland Venture

Edited by B. W. Allred and F. C. Dykes. 223 pp. Illus. University of Oklahoma Press, Norman, Okla. 1957.

Numerous books have been published on various phases of agriculture and conservation, but never before, to the knowledge of this reviewer, have so many distinguished specialists and writers combined efforts to tell the story of outstanding conservation contributions and accomplishments on a specific area as they do in *Flat Top Ranch*.

Two decades of achievements on Flat Top Ranch, located near the small town of Walnut Springs between Waco and Ft. Worth in East Central Texas, are narrated in this book and are a tribute to the skilled guidance of one man, Charles Pettit, ranch owner. The ranch now is comprised of 17,000 acres of land as a result of combining several land units.

The book is stimulating, constructive, and leads the reader very skillfully through 17 chapters that are completely free of technical terms and mathematical formulae. In addition, pictures strikingly point out the conservation story as it applies to the different phases of the ranch operation.

To Mr. Pettit grass was the basic resource and he made his ranching operation sufficiently flexible that he might obtain continuous improvement of the grass cover over a period of years. Thus when the severe drought of 1951-56 ended, the Flat Top Ranch was still productive in contrast to many adjoining ranches.

In a chapter on grassland improvement and conservation, B. W. Allred, one of America's outstanding range management specialists, states that "Flat Top is one of the few spreads where big bluestem, indiangrass, and switchgrass grow tall enough in the valleys to hide a bunch of Herefords." Large and important native flora has developed through desirable management practices. Native grass seed produced on the ranch was sown on both old croplands and low-producing native lands with excellent success.

G. O. Hendrick describes farming methods and reclamation work, telling step by step of a 587 acre unproductive ranch unit brought back to a productive state through good range management practices.

Livestock has played an important role in the success of Flat Top. Improvement breeding and feeding management are discussed by W. B. Roberts, resident manager of the ranch. The Hereford was selected as the breed that Flat Top wished to maintain, and many experimental trials were introduced to breed in the desirable traits that would specifically mark the ranch's animals as superior. The breeding techniques and methods employed under ranch conditions are of outstanding interest. As Martine Emert says in a chapter summing up overall improvements, "When seven bulls gain 4025 pounds in *eight* months on *three* acres of land, that is spectacular."

A short chapter by owner Charles Pettit tells of hog-raising as a profitable venture. He found that "hogs are only as dirty as their owners force them to be."

Frank Reeves has contributed a chapter, "Fences, Roads & Cattleguards," setting forth Mr. Pettit's thoughts and planning in a range program for 100 pastures and traps. Efficient management and the marketing of livestock are facilitated by cattleguards on 150 miles of roads inside the ranch boundaries.

William R. Van Dersal, in a chapter entitled "The Wildlife on Flat Top Ranch," describes the abundance of wildlife which occurred in the region when pioneers settled there and shows how most of the original species are now flourishing again due to the conservation program that was put into operation.

Other chapters of interest are a brief description of the geological formations which exist on the land, the role of water in the development of the ranch, and the working conditions of the employees there. The book opens with two chapters written by the late distinguished novelist, Louis Bromfield.

VERNON A. YOUNG
Texas A & M College

A Naturalist in Palestine

By Victor Howells. 180 pp. Illus. Philosophical Library. New York. 1956. $6.

Readers interested in a naturalist's investigations in Palestine before the Mandate and prior to the creation of the State of Israel, will find this book an absorbing and unusually vivid account of the insect, bird, animal, and fish life of this country. Foresters, however, may not find much in Victor Howells' book to hold their attention. Although much is written of the physical characteristics of the country and its plant life, too little mention is made of the wooded areas to maintain their interest. Nevertheless, the author's capacity to make one feel that he is participating in the findings may make the reader wish to go along with Howells on his nine months tour of Palestine.

Much of Naturalist Howells' studies take place in a 4 or 5 square mile area at the mouth of the Wadi Gazzah, not far from the town of Gaza. Not all of these searching observations, however, are limited to this restricted zone. He also takes the reader to the desolate Dead Sea, on a fishing expedition to the Sea of Galilee, on a late trip through the streets of old Jerusalem, and to other fascinating places in Palestine. Howells apparently has a good sound fundamental knowledge as a naturalist. Coupled with his rare powers of description and his alluring chapter headings, one finds his book an invitation to further reading. References to the Arabian natives, his contacts with them, their habits and customs further enliven this account of a Naturalist in Palestine.

HYMAN M. GOLDBERG
U. S. Forest Service, Milwaukee, Wisconsin

Reading the Landscape

By May Theilgaard Watts. 230 pp. Illus. Macmillan Company, New York. 1957. $4.75.

There is always a need for books which make the approach, logic, and excitement of science available to general readers. Mrs. Watts has intended this book "to give the general reader an idea of the scope and application of ecology," which she considers to be, "a diverting traveling companion and an equally good companion for one staying at home. It finds a story in a school yard . . . an old cemetery . . . and even an old window box."

Staff naturalist at the Morton Arboretum in Illinois, Mrs. Watts has had considerable experience in presenting nature to amateurs. The arboretum's Nature Keys have been widely used by biology teachers and beginners. Mrs. Watts has also written nature articles for periodicals and has published beginners' keys for identification of trees and wild flowers.

In introducing ecology to beginners, the author chooses 13 locations and proceeds in a leisurely, narrative style to point out what can be observed, reasoned, and surmised from evidence presented by nature. She has selected some spectacular sites, as in the fascinating description of the Indiana dunes, or the vivid picture of tiny tundra plants. She has also, however, discussed everyday habitats—a fence row, a yard and garden, a pasture. The book is not intended to give a complete picture of ecology, but rather an introduction via habitats the author found especially interesting.

Throughout the book, human ecological patterns are interwoven with those of plant and animal life. In describing the Smokey Mountains, she compares plant disjuncts with the isolated Elisabethan folkways and language. Changing rural life in the Midwest is superimposed upon plant succession in a country schoolyard. The last chapter, "Fashions as an Ecological Factor," should provide a good many chuckles and some understanding for garden enthusiasts. Cleverly written, it describes changing fashions in houses, gardens, and family habits from 1850 to the present.

Simple ink drawings throughout the book helpfully sum up ideas.

Presenting science to the beginner is filled with difficulties, some of which Mrs. Watts has not been able to avoid. By simplification, theories may be presented dogmatically, and readers may find the exceptions confusing when they begin to observe independently. The variable patterns of plant succession which the author undoubtedly intends as general trends may frequently be assumed by readers to be exact patterns, until he discovers otherwise in nature. An uninformed reader also may infer teleological meaning in descriptions of fascinating adaptations of plants to environment, unless the absence of such meaning is called to his attention.

Some obsolete plant names appear: *Sticronema* for *Lysmachia*, *Aspidium* for *Dryopteris*, *Impatiens biflora* for *I. capensis*, *Trientalis americana* for *T. borealis*, among others. Common names used are sometimes ones more frequently used for other plants, as 'alder' for 'meadowsweet' (*Spirea alba*) and red top for the Calamagrosits species usually called blue joint.

Not written primarily for foresters and biologists, the book will be of use to them primarily as an interesting review of habitats and ideas. It can also be a useful reference for methods of presenting scientific ideas to lay groups.

ISABEL F. AHLGREN
Quetico-Superior Wilderness Research Center

Wood—Colors and Kinds

Compiled by the Forest Products Laboratory, U. S. Forest Service. 36 pp. Illus. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 1956. 50 cents.

The problem of identifying different kinds of wood is simplified by a new handbook prepared at the Forest Products Laboratory, Madison, Wis. and published by the Forest Service, U. S. Department of Agriculture.

The book contains full-color, natural-size photographs of 32 common widely used woods. Simple, nontechnical descriptions tell how to distinguish each species by color, grain markings, and other characteristics easily seen in the photographs.

The Forest Products Laboratory prepared the book especially for persons untrained in professional wood-identifying techniques. Dr. B. Francis Kukachka, in charge of wood identification services at the Laboratory, selected the species and prepared the descriptions.

The illustrations were reproduced by the most advanced photographic and color printing processes available in order to assure that color, grain, and other identifying markings would be as true to life as possible.

The 32 kinds of wood pictured

actually represent more than 60 American species. Some species are so much alike that their wood cannot be differentiated even under the microscope. In these cases, species differences are mainly in the leaves, fruit, and bark.

Eighteen hardwoods and 14 softwoods are described and pictured. The hardwoods include American beech, American sycamore, rock elm, American elm, black walnut, black cherry, hickory, white ash, quaking aspen, American basswood, sweetgum, black tupelo, white and red oak, yellow birch, sugar maple, yellow-poplar, and cottonwood.

Softwoods include baldcypress, redwood, incense-cedar, western red-cedar, shortleaf pine, ponderosa pine, Sitka spruce, Engelmann spruce, sugar pine, western white pine, western larch, Douglas-fir, western hemlock, and white fir.

Each photograph includes an edge-grain, and a flat-grain surface of the same species.

A glossary defines precisely many commonly used wood terms, including those used in the text to describe the different woods.

Publications of Interest

The American Pulpwood Association, 220 East 42nd St., New York 17, N. Y., has recently published a *Directory of Research in the Growing and Harvesting of Pulpwood*. It was prepared by Allen Horn, State University of New York College of Forestry, under the guidance of Dr. Paul F. Graves of that institution. Eight individually bound mimeographed sections cover the following subjects: Introduction and Classification System; General Forestry and Forest Botany; Silviculture; Forest Protection; Harvest of Wood: Logging and Transport; Forest Products and their Utilization and Forest Engineering; Forest Management; Forest Economics and Associated Uses and Influences of the Forest. The directory contains over 900 individual reports of research being carried on by private and public agencies in the U. S. and its possessions. Also listed are published results. Copies are available from APA at $8.40 for its members, $12 for nonmembers.

* * *

The Forestry Biology Division of the Canadian Department of Agriculture has recently released its annual report of the *Forest Insect and Disease Survey for 1956*. Conditions are treated in detail for the Atlantic provinces as well as the provinces of Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. Spruce budworm and larch sawfly were considered the principal forest insect problems of 1956. Emphasized in the report are the unusual weather conditions of the past year and the resulting effect on disease spread. Copies of the 95-page booklet are available from Edmond Cloutier, Queen's Printer and Controller of Stationery, Ottawa. No price is indicated.

Florida's Forests, a 50-page report to the Governor of Florida, other administrative agencies, and the legislature, is the product of months of study by a special Task Committee of the Florida Forestry Council representing some 20 organizations and associations having to do with all forms of forest and soil conservation and utilization throughout the state.

The task has been most competently done and the presentation of conclusions and recommendations is a model of conciseness and ease of comprehension. The illustrations are all pertinent. The main divisions of the report deal with forest protection, forest management, forest education, and forest research—all supported by adequate statistical tables in the Appendix. Much of the technical material is supplied by the U. S. Forest Service and the Florida Forest Service—and all are used most effectively.

* * *

Meditations of a Forester. By Elmer Shaw (Shaw-Craft Creations, 709 Eastdale Drive, Fort Collins, Colo. 48 pp. Illus. Paper bound, $1.00; delux edition, $2.00.) is a book of poetry and essay illustrated with sketches by the author. The author's selections of his work presented in this modest though attractive volume vary from mysticism, through philosophy, to humor. Always discernible is a deep sense of man's kinship with the beauties and marvels of the natural world as well as a keen insight into the human ability to be ridiculous and sublime by spells. Shaw, a research forester by profession, is currently a technical editor for the U. S. Forest Service.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University College of Forestry at Syracuse University*
Range Management Section Complied by Division of Bibliography, Library, U. S. Department of Agriculture

General

Forestry Education in Pennsylvania. Ed. by Henry Clepper. 250 pp. Illus. Penn State-Mont Alto Forestry Alumni Ass'n., University Park, Pa. 1957. $4.

A Handbook of Softwoods. 73 pp. Great Britain Dept. of Scientific and Indus. Research, London. 1957. 8s.6d. (H. M. Sta. Off.)

Quest for a Continent (Antarctica). By Walter Sullivan. 375 pp. Illus. McGraw-Hill, New York. 1957. $5.50.

Tree Care. By J. M. Haller, 224 pp. Illus. Macmillan Co., New York. 1957. $5.95.

Youth and the Forest Industries; A Progress Report by American Forest Products Industries, Inc. 15 pp. Illus. Washington 6, D. C. 1956.

Conservation

Conservation Is Good Business. 35 pp. Illus. Chamber of Commerce of the U. S., Washington 6, D. C. 1957. 50 cents.

Forest Management

Board-Foot Volume Tables for Small Trees. By J. A. Whitman. 29 pp. The Technical Press, Raleigh, N. C. 1957. $1.

Forest Island. 4 pp. Illus. British Columbia Forest Serv., Vancouver. 1957. Publ. No. B. 45.

Timber Management Plan Boise National Forest Working Circle . . . By C. R. Melvin and others. 134 pp. Maps. U. S. Forest Service. Region 4, Ogden, Utah. 1956. Mimeog.

Forest Resources

Forest Inventory Statistics for Whitfield County, Georgia. 18 pp. TVA, Norris. 1957. For. Bul. No. 50. Mimeog.

Forests of East Oklahoma, 1955-56. 34 pp. Southern Forest Expt. Sta., New Orleans, La. 1957. For. Survey Release No. 79. Mimeog.

North Carolina's Timber Supply, 1955. By R. W. Larson. 71 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1957. For. Survey Release No. 49. Mimeog.

Protection

Pine Needle Scale. By H. C. Miller and A. H. MacAndrews. 4 pp. Illus. State Univ. College of Forestry, Syracuse, N. Y. 1957. No. 13 of a series on forest tree insects and diseases.

Pine Sawflies. By H. C. Miller and A. H. MacAndrews. 4 pp. Illus. State Univ. College of Forestry, Syracuse, N. Y. 1957. No. 14 of a series on forest tree insects and diseases.

References of Value in Studies of Insects Affecting the Southern Pines, An Annotated List. By R. C. Thatcher. 37 pp. Southern Forest Expt. Sta., Nacogdoches, Texas. 1957. Bul. No. 1.

Silviculture

Bamboos—Their Silviculture and Management. By V. S. Krishnaswamy. 6 pp. Manager of Publications, Delhi, India. 1956. Indian For. Leaflet No. 150 (Silv.) As.-/9/-or 10d.

Forest Tree Breeding Work in Korea. By S. K. Hyun. 16 pp. Illus. Institute of Forest Genetics, Central Forest Expt. Sta., Suwon, Korea. 1956. Inst. Paper No. 1.

4th Northeastern Forest Tree Improvement Conference, Johnsonburg, Pennsylvania August 7-8, 1956. Proceedings. 54 pp. Illus. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1957. Mimeog.

Pine Seed Orchards of SCA (Swedish Cellulose Co.) 14 pp. Illus. The Society for Practical Forest Improvement, Uppsala, Sweden. Dec. 1956.

Some Results of Seeding and Fertilization to Improve Southern Forest Range. By L. K. Halls, G. W. Burton, and B. L. Southworth. 26 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1957. Sta. Paper No. 78. Mimeog.

Soils

Physical Properties of 134 *Soils in Six Northeastern States.* By A. R. Eschner, B. O. Jones, and R. C. Moyle. 10 pp., 11 tables. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1957. Sta. Paper No. 89. Mimeog.

Properties of 160 *Soils of Four North Central States.* By J. L. Thames and E. I. Swensen. 6 pp. Tables. Lake States Forest Expt. Sta., St. Paul, Minn. 1956. Sta. Paper No. 38. Mimeog.

The Quantity and Nutrient Content of Hard Beech Litter. By R. B. Miller and F. B. Hurst. 14 pp. Illus. New Zealand Forest Serv., For. Res. Inst., Wellington. 1957. Soil Bur. Publ. No. 114; New Zealand Forestry Research Notes No. 8.

Wood Preservation

Penetration and Exudation of Oil in Sections of Pine Poles Treated with Creosote-Penta-Chlorophenal Mixtures. By H. P. Sedziak. 17 pp. Forest Products Labs. of Canada, Ottawa. 1956. Rept. O-175. Mimeog.

Seasoning and Preservative Treatment of Tanoak Lumber. By D. J. Miller and R. D. Graham. 8 pp. Illus. Oregon Forest Products Lab., Corvallis. 1957. Rept. No. P-3. Mimeog.

Service Life of Treated and Untreated Fence Posts 1956 . . . By R. D. Graham and D. J. Miller. 29 pp. Oregon Forest Products Lab., Corvallis. 1956. Progress Report No. 10.

Timber Preservation. 79 pp. Illus. British Wood Preserving Ass'n., 6 Southampton Pl., London, W. C. 1 and Timber Development Ass'n., Ltd.; 21 College Hill, London, E. C. 4.

Wood Technology and Utilization

Directory of Wood-Using and Related Industries in East Texas. By N. T. Samson. 137 pp. Stephen F. Austin State College, Dept. of Forestry, Nacogdoches, Tex. 1957. Bul. No. 2.

The Mechanical Properties of Australian, New Guinea, and Other Timbers. By A. M. Stewart and N. H. Kloot. 71 pp. Commonwealth Scientific and Indus. Research Org., Melbourne. 1957. Bul. No. 279.

The Mechanical Properties of White-Speck Lumber, Veneer and Plywood. By J. S. Fujii, B. S. Bryant, and H. D. Erickson. 43 pp. College of Forestry, Univ. of Washington and the Edward Hines Lumber Co., Seattle 5. 1956. Mimeog.

The Strength Properties of Plywood. Part 3: The Influence of the Adhesive. By W. T. Curry. 26 pp. Illus. Great Britain. Dept. of Scientific and Indus. Res. For. Prod. Res., London. 1957. Bul. No. 39. 2s. 6d.

Wood: Colors and Kinds. Forest Products Lab., Madison, Wis. 36 pp. Illus. 1956. Agric. Handbook No. 101. 50 cents (Gov. Print. Off.).

Society Affairs

Officers and Council
1956-1957

DEWITT NELSON, *President*
Department of Natural Resources
315 State Office Building 1
Sacramento 14, Calif.

B. E. ALLEN
Union Bag-Camp Paper Corporation
P. O. Box 570
Savannah, Ga.

PHILIP A. BRIEGLEB
Southern Forest Experiment Station
704 Lowich Building
2026 St. Charles Avenue
New Orleans 13, La.

C. HUXLEY COULTER
Florida Forest Service
Tallahassee, Fla.

GEORGE A. GARRATT, *Vice President*
School of Forestry
Yale University
New Haven 11, Conn.

STANLEY G. FONTANNA
School of Natural Resources
University of Michigan
Ann Arbor, Mich.

MAURICE K. GODDARD
Department of Forests and Waters
Harrisburg, Pa.

EDWIN F. HEACOX
Weyerhaeuser Timber Company
Tacoma 1, Wash.

HENRY CLEPPER, *Executive Secretary*
Mills Building, 17th Street at Pennsylvania Avenue, N.W.
Washington 6, D. C.

JOSEPH S. ILLICK
College of Forestry
State University of New York
Syracuse 10, N. Y.

J. HERBERT STONE
U. S. Forest Service
729 N.E. Oregon St.
Portland 8, Ore.

HENRY J. VAUX
School of Forestry
University of California
Berkeley 4, Calif.

The President's Column

DEWITT NELSON

American industries are planning to spend $6,000,000,000 on research during 1957. This money will be spent on research in developing new commodities, research in processing and manufacturing to produce better products at less cost, research to improve the utilization of raw materials, research in design, merchandising, and a thousand other areas where industry can better serve and be served.

As foresters we are dealing with the management and production of reproducible raw materials important to our industrial, social, and economic welfare. Each year research is playing a more important role in the production of food and fiber from the managed and controlled resources of soil, water, forests, and forage. From these resources come the collateral values of soil stabilization, recreation areas, opportunities for hunting and fishing, inspirational beauty, and others, to answer individual needs.

With our expanding population and its many demands for more products of every kind, forest research must move ahead. Competition is keen for today's dollar, whether it be for research, production, or management. Budgets for those items that reasonably assure a prompt return are easier to get than those that look to some future benefit. It is much easier to be adequately financed to suppress fires than prevent them; to control insect epidemics than study life cycles of pests; to build dams than to learn the relationship between water and vegetation; to improve ranges with fire rather than with mechanical, chemical, and management methods.

These examples indicate a cautiousness or a conservatism that is out of proportion to the benefits that would accrue if a more reasonable percentage of our forest management and protection dollar were to be spent in learning how to more effectively protect, manage, improve, harvest, and produce the many resources from our forest, range, and watershed lands.

How often have we heard the statement, "This should have been done ten years ago," or "Those are the problems to which we need the answers today"?

Have professional foresters, as a group, stressed the need for new knowledge which can be gained only through research as strongly and as urgently as they should? Have we waited for the problem to become critical before we pled for research recognition?

Today the results of research in many fields are accepted as a matter of fact. Research institutes and organizations are a widely accepted form of business producing the answers to thousands of problems each year.

The research climate is now better than it has ever been. Is forestry in its broad sense and with its many facets receiving its share of the research dollar?

Because it is of prime importance, the value of research and its place in our profession will be discussed during the annual meeting at Syracuse.

I hope to see you there.

DeWitt Nelson

Annual Meeting

Society of American Foresters

Syracuse, N. Y. November 10-13, 1957

Theme: "Forest Land Use in Transition"

Schedule of Events

Members, their ladies, and guests who plan to attend the Society's 57th annual meeting are urged to arrive in Syracuse on Sunday, November 10, in order to visit the College of Forestry where there will be "open house" from 2 to 5 p.m.

The open general session will start at 9:30 a.m., Monday morning in the ballroom of the Syracuse Hotel.

The following program for the various activities is up to date as of the time of going to press. The final program will be published in the September issue.

Open House at the College of Forestry

From 2 to 5 p.m. on the afternoon of Sunday, November 10, there will be an informal reception and a series of guided trips through the buildings of the State University College of Forestry at Syracuse University, including the new Baker Forest Products Laboratory.

Special bus transportation will be provided from Hotel Syracuse.

Refreshments will be provided in the student lounge in Marshall Hall of the College.

All Society members and their guests are cordially invited to this reception.

Association of Consulting Foresters

Sunday evening, November 10

J. Atwood Whitman, President
Seymour I. Somberg, Executive Secretary
James D. Pond, Program Chairman

Open Session

Panel discussion: "How the Consulting Forester Operates."

Moderator, James Craig, Forestry Suppliers, Jackson, Miss.

Participants, George C. Kiefer, Jr., Salisbury, Conn.

Verne D. Bronson, Eugene, Ore.

Edward Stuart, Jr., Hampton, Va.

Thomas F. Schweigert, Petoskey, Mich.

"Place of the Consultant in Integrated Logging." C. S. Herr, Brown Company, Berlin, N. H.

DEAN HARDY L. SHIRLEY
Annual Meeting General Chairman

"Cooperation of State Agency with the Consultant." Charles F. Baar, New York Conservation Department, Albany, N. Y.

Closed Session

A business meeting for Association members only will follow the open session.

Field Trips

Four field trips of special interest to consulting foresters have been arranged. Their time and dates will be announced at the open meeting.

General Meeting

Monday, November 11

Dwight B. Demeritt, Chairman

Morning Session

Theme: "Forest Land Use in Transition"

1. "The Northeast's Forest Heritage." Ralph W. Marquis, Northeastern Forest Experiment Station, Upper Darby, Pa.

2. "Impact of Shifting Land Use Patterns on Forest Policies and Programs." E. W. Littlefield, Division of Lands and Forests, New York Conservation Department, Albany, N. Y.

3. "Effect of Land Use Trends on Forestry Needs and Opportunities." George A. Garratt, School of Forestry, Yale University, New Haven, Conn.

Society Affairs Session

Monday afternoon, November 11

DeWitt Nelson, President
George A. Garratt, Vice President
Henry Clepper, Executive Secretary

1. Report of the President.
2. Report of the Executive Secretary.
3. Report of the editor of Society publications, Arthur B. Meyer.
4. Report of the editor of *Forest Science*, S. H. Spurr.
5. Committee reports.

Division of Forest Recreation

Monday evening, November 11

James P. Gilligan, Chairman
Felix C. Koziol, Vice Chairman
Frank W. Childs, Secretary

1. "Plans and Problems of the U. S. Forest Service Operations Outdoors." Edward P. Cliff, Branch of National Forest Resource Management, U. S. Forest Service, Washington, D. C.

2. "Recreational Development in the Forest Preserves of New York." William M. Foss and W. D. Mulholland, Division of Lands and Forests, New York State Conservation Department, Albany, N. Y.

3. "Recreation versus Forest Products in Land Use Planning." Frank W. Childs, National Park Service, Omaha, Nebr.

4. "Natural Area Values." John F. Shanklin, Technical Review Staff, U. S. Department of the Interior, Washington, D. C.

Division of Watershed Management

Monday evening, November 11

E. G. Dunford, Chairman
Peter W. Fletcher, Vice Chairman
Sidney Weitzman, Secretary

1. "Watershed Problems in New York State." H. G. Wilm, State University of New York, College of Forestry, Syracuse, N. Y.

2. "Forest Watershed Problems and Opportunities in the Northeast." Howard Lull and Norman R. Tripp, North-

eastern Forest Experiment Station, Upper Darby, Pa.

3. "Municipal Watershed Management in Practice." John M. Heilman, Division of Water Supply, Newark, N. J.

4. "Economic Research Needs in Watershed Management." G. R. Gregory, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Division of Education

Monday evening, November 11

David M. Smith, Chairman
A. Bigler Crow, Vice Chairman
Peter W. Fletcher, Secretary

"Field Use of Libraries." Martha Meelig, College of Forestry, State University of New York, Syracuse, New York.

Symposium: Encouraging the Best Qualified Young Men to Enter Forestry.

1. Report of the Society Committee on Career Counselling. T. D. Stevens, Department of Forestry, Michigan State University, East Lansing, Mich.

2. "What Does Forestry Have to Offer America's Top Students Today?" Bernard A. Anderson, Division of Personnel Management, U. S. Forest Service, Washington, D. C.

3. "The Public Relations Approach to Recruiting Forestry Students." Floyd E. Carlson, College of Forestry, State University of New York, Syracuse, N. Y.

Division of Silviculture

Tuesday, November 12

Henry I. Baldwin, Chairman
James D. Curtis, Vice Chairman
Earl H. Tryon, Secretary

Morning Session

1. "Oak Wilt: Its Significance, Spread, and Prevention." A. J. Riker, Department of Plant Pathology, University of Wisconsin, Madison, Wis.

2. Panel discussion: "The Place of Tree Improvement in Forest Pest Control."

Moderator, Harold J. Lutz, School of Forestry, Yale University, New Haven, Conn.

"The Possibilities and Limitations of Breeding for Pest Resistance in Forest Trees." Ernst J. Schreiner, Division of Forest Genetics, Northeastern Forest Experiment Station, Upper Darby, Pa.

"The Outlook for Breeding Trees Resistant to Insects." James A. Beal, Division of Forest Insect Research, U. S. Forest Service, Washington, D. C.

"Limitations of Tree Breeding and Selection in the Control of Disease." John S. Boyce, Osborn Botanical Laboratory, Yale University, New Haven, Conn.

"A Silviculturist's Viewpoint." George S. Meagher, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

3. "Possibility of Developing Strains of White Pine Resistant to the White Pine Weevil." William J. Gabriel, Northeastern Forest Experiment Station, Burlington, Vt.

4. "Height Growth of 81 Progenies of Ponderosa Pine." R. Z. Callaham and A. A. Hasel, California Forest and Range Experiment Station, Berkeley, Calif.

5. "Detection and Characteristics of Triploid Quaking Aspen in Nature." J. P. van Buijtenen, Dean W. Einspahr, and Philip N. Joranson, Institute of Paper Chemistry, Appleton, Wis.

Afternoon Session

1. Business meeting. Election of officers.

2. Report of the Committee on Stocking. C. A. Bickford, Northeastern Forest Experiment Station, Upper Darby, Pa.

3. Report of the Committee on Tree Improvement. Scott S. Pauley, School of Forestry, University of Minnesota, St. Paul, Minn.

4. "Forest Weed Control." Robert R. Morrow, Jr., Department of Conservation, Cornell University, Ithaca, N. Y.

5. "Shallow Soils, Hardpans, and Root Penetration in the Spruce-Fir-Hardwood Forest of Northern New England." T. F. McLintock, Southeastern Forest Experiment Station, Lake City, Fla.

6. "Variation in Development of Low Plant Cover Following Chemical Brush Control." W. C. Bramble, W. R. Byrnes, and D. P. Worley, School of Forestry, Pennsylvania State University, University Park, Pa.

7. "Sand Pine Regeneration on the Ocala National Forest." Robert W. Cooper, Southeastern Forest Experiment Station, Lake City, Fla.

8. "Ecology of White Pine Silviculture in Central Ontario." David R. M. Scott, College of Forestry, University of Washington, Seattle, Wash.

9. "Wind-Caused Mortality in Minnesota Black Spruce in Relation to Cutting Methods and Stand Conditions." M. L. Heinselman, Lake States Forest Experiment Station, Grand Rapids, Minn.

10. "Effect of Storage Conditions on the Viability of Rocky Mountain Tree Pollens." Gilbert H. Fechner, College of Forestry and Range Management, Colorado State University, Fort Collins, Colo.

Division of Private Forestry

Tuesday morning, November 12

William C. MacAdam, Chairman
George V. Hjort, Vice Chairman
George W. Abel, Secretary

1. "Terminating Federal Supervision over Indian Forests." Kenneth B. Pomeroy, American Forestry Association, Washington, D. C.

2. "Fifty Years of Industrial Forestry with the Empire State Forest Products Association." Nelson C. Brown, Syracuse, N. Y., and A. B. Recknagel, Ithaca, N. Y.

3. "Significance of Price Reporting in Forestry." A. C. Shaw, Champion Paper and Fibre Company, Hamilton, Ohio.

4. Panel Discussion: "Forest Management by Private Foresters in the Northeast."

Moderator, William P. House, Consulting forester, Chesham, N. H.; Robert Moore, Consulting Forester, Danville, Pa.; James D. Pond, Pond and Moyer Company, Ithaca, N. Y.

Division of Forest-Wildlife Management

Tuesday morning, November 12

William L. Webb, Chairman
Elbert H. Reid, Vice Chairman
Odell Julander, Secretary

1. "The Future of Statewide Deer Herd Management." Dale A. Jones, Division of Game Management, Utah Department of Fish and Game, Salt Lake City, Utah.

2. "Future Role of State Conservation Departments in Forest-Wildlife Management." Frank B. Barick, Game Division, North Carolina Wildlife Resources Commission, Raleigh, N. C.

3. "Future Role of Federal Agencies in Forest-Wildlife Management." Clarence Cottam, Rob and Bessie Welder Wildlife Foundation, Sinton, Tex.

4. "Future of Forest-Wildlife Management in the Plans of Woodland Owners." Arthur L. Bennett, Department of Woodlands Operations, Armstrong Forest Company, Johnsonburg, Pa.

5. "Will There be a Transition from Free Public Hunting to Paid Shooting?" Edward L. Kozicky, Conservation Department, Olin Mathieson Chemical Corporation, East Alton, Ill.

6. Business meeting.

Division of Forest Products

Tuesday afternoon, November 12

Stephen B. Preston, Chairman
Harry E. Troxell, Vice Chairman
Bernard W. Granum, Secretary

1. "Changes in the Wood-Using Industry Accompanying Changes in Forest Resources." Raymond J. Hoyle, College of Forestry, State University of New York, Syracuse, N. Y.

2. "Quality of Lumber which is not Measured by Grade." James S. Bethel, School of Forestry, North Carolina State College, Raleigh, N. C.

3. "Suitability of Eastern White Pine and Red Pine for Veneer and Plywood." John F. Lutz, Forest Products Laboratory, Madison, Wis.

4. "The Use of Bolter Saws in Conversion of Small Hardwood Logs." Richard M. Pierce, Forster Manufacturing Company, Farmington, Maine.

5. "The Reaggregated Wood Products Industry and What it Means to Intermediate and Salvage Cuttings." Paul J. Bois, Southeastern Forest Experiment Station, Asheville, N. C. and Arthur H. Haigh, Jr., Morgan Manufacturing Company, Black Mountain, N. C.

6. "Factors Contributing to the Increased Utilization of West Coast Hardwoods." Fred E. Dickinson, California Forest Products Laboratory, Richmond, Calif.

Division of Public Relations

Tuesday afternoon, November 12

Charles W. Mattison, Chairman
Fred E. Winch, Jr., Vice Chairman
J. Walter Myers, Jr., Secretary

Program not received.

Division of Forest Management

Wednesday, November 13

Gerald S. Wheeler, Chairman
Walter F. McCulloch, Vice Chairman
E. W. Littlefield, Secretary

Morning Session

1. "Cover Mapping Massachusetts from Aerial Photographs." William P. MacConnell, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst, Mass.

2. "A Trial Run in Continuous Forest Inventory in Canada." R. G. Belcher, Canadian International Paper Company, Montreal, P. Q., Canada.

3. "Pulpwood Procurement in a Metropolitan Region." Stanley W. Hamilton, West Virginia Pulp and Paper Company, Mechanicville, N. Y.

4. "Some Problems of Tropical Forest Management." Sir Herbert Howard, Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England.

Afternoon Session

1. "Adapting the Management of a Large Tract of Private Timberland to Industrial Needs." Dwight B. Demeritt, Dead River Company, Bangor, Maine.

2. "Pilot Woodland Management Program in New Hampshire." Kenneth E. Barraclough, Extension Service, University of New Hampshire, Durham, N. H.

3. "Air Attack on Forest Fires." M. M. Nelson, Division of Fire Control, U. S. Forest Service, San Francisco, Calif.

4. "Growing Importance of Hardwoods to the Paper Industry in the Northeast." Gerald A. Pesez, International Paper Company, Glens Falls, N. Y.

5. Business meeting.

Division of Forest Economics and Policy

Wednesday morning, November 13

Carl H. Stoltenberg, Chairman
S. Blair Hutchinson, Vice Chairman
Ernest M. Gould, Jr., Secretary

1. "Forest Taxation Problems: How Serious and for Whom?" William A. Duerr, College of Forestry, State University of New York, Syracuse, N. Y.

Comments:

George B. Amidon, Minnesota and Ontario Paper Company, International Falls, Minn.

Paul M. Dunn, St. Regis Paper Company, New York, N. Y.

Paul F. Liniger, Industrial Forestry Association, Portland, Ore.

2. "What Can be Accomplished"

"By Improving the Property Tax: Some Promising Developments." Ellis T. Williams, Division of Forest Economics Research, U. S. Forest Service, Washington, D. C.

"By Special Forest Tax Laws: Lessons from New Hampshire." William P. House, Consulting Forester, Chesham, N. Y.

Comments:

W. D. Hagenstein, Industrial Forestry Association, Portland, Ore.

E. S. Hurd, Consolidated Water Power and Paper Company, Rhinelander, Wis.

James H. Kitchens, Jr., Louisiana Forestry Association, Alexandria, La.

Division of Range Management

(Joint meeting with the Division of Forest-Wildlife Management)

Wednesday morning, November 13

Elbert H. Reid, Chairman
Grant A. Harris, Vice Chairman
Joe A. Wagner, Secretary

Topic: "Game Range Habitat Management."

1. "Effect of Pulpwood Cutting Practices on Deer." John D. Gill, Game Division, Maine Department of Inland Fisheries and Game, University of Maine, Orono, Maine.

2. "The Effect of Hardwood Removal on Wildlife." Vincent H. Reid, U. S. Fish and Wildlife Service, Nacogdoches, Texas.

3. "Differences in Range Vegetation Resulting from Grazing by Deer, Cattle, and Sheep." L. E. Riordan, Colorado Game and Fish Department, Denver, Colo.

4. "The Use of Fire in California Chaparral for Game Habitat Improvement." H. H. Biswell, School of Forestry, University of California, Berkeley, Calif.

5. "The Relation of Forage Production to Silvicultural Thinning of Ponderosa Pine in the Black Hills of South Dakota." Richard M. Hurd and Charles P. Pase, Rocky Mountain Forest and Range Experiment Station, Rapid City, S. Dak.

The Annual Dinner

Wednesday evening, November 13

Maurice K. Goddard, Toastmaster

Presentation of awards for outstanding achievement in biological research contributing to the advancement of forestry.

Address by Fairfield Osborn, president of the Conservation Foundation, New York, N. Y.

Entertainment.

Field Trips

Four field trips have been planned prior to the meeting. These trips will be run on November 8 and 9 (Friday and Saturday). Three of them are to be of one-day duration, leaving Syracuse in the morning and returning in the evening of the same day. The fourth trip requires two days, leaving Syracuse Friday morning and returning Saturday evening.

If desired, two of the one-day trips can be selected—one on Friday and one on Saturday. Travel is to be by chartered bus.

Advance registration will be required to permit arrangements for

transportation and for food and lodging where these are needed. Chairman of the Field Trip Committee is Neil J. Stout, State University College of Forestry, Syracuse 10, N.Y.

Since the one-day trips will cover about 200 miles, the cost per person will approximate $10. The two-day trip will be about 400 miles in length and the cost per person will approximate $20 per day.

Descriptions of the trips follow:

Trip Number 1

A Study Of Transition In Land Use

A one-day trip within a 100-mile radius southeast of Syracuse to observe a wide range of land uses in an area where some of the land has completed the cycle of forest to farm, to idle land, and back to forest; but where aggressive urban development is forcing drastic changes in the planners' long-term views. Here, too, will be an opportunity to study the impact of super highways on land use. One such road is in operation across the area from east to west, and another is under construction north to south.

Considerable data have been collected from this area by the Colleges of Agriculture and Forestry as well as other state agencies. Two of the chief participants in this inventory of resources and formulation of pattern: Dr. Howard E. Conklin of the Department of Agricultural Economics of the State College of Agriculture at Cornell University and Prof. James E. Davis of the Department of Forest Extension at the State College of Forestry at Syracuse University.

Trip Number 2

The Submarginal Land Problem Solved By Reforestation

A one-day trip to visit plantations in central New York, where large areas of land were purchased by the state and planted to conifers during the 1930's. The problems of management, with emphasis on pruning and thinning, accessibility and labor supply, and future development of the plantations will be presented by Charles E. Baker, district forester of the New York State Conservation Department, Norwich.

New York State was faced with the problem of 6 million acres of submarginal and abandoned farm lands in the late 1920's. By constitutional mandate in 1930 the purchase and reforestation of 1 million acres were proposed. Twenty-seven years later, 300 million trees planted on this land, known as State Forests, plus forest stand improvement on natural stands that were part of the abandoned farms, have created some of the best potential forests in New York.

About one-quarter of the reforestation on State Forests has been done in the area of this field trip. Starting at Sherburne, the trip will include demonstrations of several types of thinning and pruning in plantations 25-30 years old. Growth studies and forest inventory data on these plantations have shown that this program has solved a land problem by producing profits from forestry.

One of the highlights of the trip will be an inspection of the first Conservation Correction Camp established in 1956. This is a joint venture by the State Department of Correction and the Conservation Department on 35,000 acres of State Forests in Chenango County. Fifty boys from 16-20 years of age are engaged in a variety of forestry and game management practices.

Municipal forests of considerable size, operating under the provisions of the New York Forest Practice Act, will also be visited.

Trip Number 3

Hardwood Woodlots and National Wildlife Refuge

A one-day trip to visit two of the most productive woodlots in central New York and the Montezuma National Wildlife Refuge. Management and yield information for the woodlots visited will be presented by Fred E. Winch, Jr., state extension forester from the College of Agriculture at Cornell University. The program at the Wildlife Refuge is being arranged by Dr. Maurice M. Alexander of the State University College of Forestry at Syracuse University.

The Lawrence Hoyt Woodlot. This farm woodlot of 15.5 acres has been in single ownership, and under a form of even-aged management, for more than 70 years. The stand is approximately 130 years old. It is composed of tulip poplar, red oak, white ash, black cherry, sugar maple, and beech. The average height of dominant trees ranges from 90 to 110 feet. It is a good example of a highly productive stand on a high quality site.

The Webster Woodlot. This woodlot of 15 acres has been under continuous management since 1932. It is composed primarily of hickory and oak on a medium to poor site. Yields have been largely in the form of fuelwood. Accurate records of income and expenses over the first 15 years of operation indicates a net return to labor of $1.30 per hour.

Montezuma National Wildlife Refuge. This refuge is located 35 miles west of Syracuse where U. S. routes 5 and 20 cross the Seneca River. Established in 1941, it contains an area of 5,819 acres, about one-half of which has been artificially flooded. Although natural habitats are provided here for a variety of wildlife, the refuge is primarily intended to serve as a resting and feeding place for migratory waterfowl. It is under intensive management by the U. S. Fish and Wildlife Service.

Trip Number 4

Forestry In The Pine Region Of The Adirondacks

A two-day trip through the southeastern region of the Adirondack Mountains. Highlights of the tour will include visits to the Luther plantations near Saratoga Springs and the Charles Lathrop Pack Demonstration Forest at Warrensburg.

The Luther forest embraces nearly 7,000 acres, about half of which is comprised of plantations of white, red, and Scotch pines, European larch, Norway spruce, and miscellaneous species ranging upwards of forty years of age. Owned and operated by a professional forester, the Luther property constitutes an outstanding example of the successful application of multiple-use management to private forest land. (See "Making a Forest Property Pay," JOURNAL OF FORESTRY, 45:781-782.)

The Pack Demonstration Forest is a 2,200-acre tract managed by the State University College of Forestry at Syracuse University. Noted for its productive white pine stands, it serves as an outdoor laboratory for teaching and research relating to silviculture, management, forest economics, botany, and utilization. Major emphasis of the visit to this property will be on white pine silviculture, and on fertilization experiments associated with the reforestation of depleted farm lands.

A brief tour of the State Forest Nursery at Saratoga Springs will be made, time permitting, following the visit to the Luther plantations. An after-dinner gathering will be held Friday evening at which representatives of the New York State Conservation Department will be on hand to discuss various phases of the Department's forestry work.

Trip will start from Hotel Syracuse at 8 a. m. November 8 and return at

6 p.m. November 9. Clothing should include raincoats, field shoes, and warm jackets. This trip is open only to men. Cost of $20 per day will cover transportation (by car pool or chartered bus), food, and lodging.

Ladies Activities

Monday, November 11. Three events are planned for this day. Chartered buses will leave Syracuse Hotel at 9:30 a. m. for the Onondaga Pottery Company plant, the home of Syracuse China. At 10:15 a.m. buses will leave for the Salt Museum on the shore of Onondaga Lake. Luncheon will be served at Martin's restaurant in Liverpool. Following entertainment there, the ladies will return to the hotel about 4 p.m.

Tuesday, November 12. The Ladies Forestry Forum will be held in the East Room of the Hotel Syracuse with a showing of time-lapse motion pictures photographed by Dr. William M. Harlow. Miss Martha Meelig, librarian of the Moon Memorial Library, State University College of Forestry will speak. Her subject is "For Women, Too." Arrangements have been made for a group luncheon and a formal tea.

Wednesday, November 13. This is a "free choice day" for the ladies to shop, visit, or to choose one of several points of interest.

Those who did not have an opportunity to visit the Onondaga Pottery Company on Monday may sign up for a special tour, leaving the hotel at 9:30 a.m. and returning about noon. Sorority women are invited to visit their respective chapter houses on the Syracuse University Campus. Groups may visit a civic center for senior citizens; tour the Council of Social Agencies building; visit the Bureau of Municipal Research and hear a talk by the director; see student art work at the Lowe Art Center on the University campus; or visit the Syracuse Museum of Fine Arts.

Ladies are asked to make a choice at the time they register so that suitable arrangements may be made. There are no luncheon plans for the ladies' group on Wednesday. In the evening the Society's annual dinner will be served in the Hotel Syracuse. All ladies are invited.

Hotel Reservations

Those expecting to attend the meeting are urged to arrive in Syracuse on Sunday, November 10. There will be open house at the College of Forestry from 2 to 5 p.m., with conducted tours of the college buildings and the new $4 million Hugh P. Baker Forest Products Laboratory.

The Syracuse Hotel will be the headquarters for the meeting. This hotel has 600 rooms, but it will not be able to accommodate all those in attendance, hence other hotels are making space available. The Onondaga Hotel (500 rooms) is one block from the Syracuse. Other convenient hotels are listed.

All requests for room reservations should be sent to the SAF Housing Committee, in care of the Chamber of Commerce, 351 South Warren Street,

SOCIETY OF AMERICAN FORESTERS

Annual Meeting

Syracuse, N. Y. November 10-13, 1957

Housing Committee, Society of American Foresters,
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Syracuse 2, New York,

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Please make a reservation for the following room accommodations for arrival on November _____ ,a.m. p.m. Departure date _____ ,a.m. p.m.

I understand that accommodations will be provided at the daily rate specified, if available; otherwise the next nearest rate will apply.

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My name: _____

Street address: _____

City, zone, state: _____

Syracuse 2, N. Y. Second and third choices should be given.

Reservations will be accepted and confirmed in the order of their receipt. Assignment of rooms will be made at the desired rate or as near as possible. Early reservation requests are desirable.

The reservation coupon printed herewith may be used. However, readers who do not want to cut the coupon from their JOURNALS may request reservations by letter, providing all the information listed on the coupon.

Single rooms will be scarce, hence when possible twin-bed rooms should be requested.

Hotels

All rates quoted are with bath.

Syracuse Hotel, 500 South Warren Street; 600 rooms. Single rooms, $6.50 to $11; double-bed rooms for two, $10.50 to $13; twin-bed rooms, $11.25 to $14.50; parlor suites, $19.50 to $40; additional bed, $2.50.

Onondaga Hotel, South Warren at East Jefferson Street (one block from Syracuse Hotel); 500 rooms. Single rooms, $6.25 to $10.50; double-bed rooms for two, $9.50 to $12.50; twin bed rooms, $10.25 to $14; suites for two, $20; additional day bed, $3.

Yates Hotel, Montgomery and East Washington Streets (three blocks from Syracuse Hotel); 200 rooms. Single rooms, $5.50 and $7; double-bed rooms for two, $7.50 and $9; twin-bed rooms, $9 and $10; three twin-beds, $12 and $13.

Mizpah Hotel, 215 East Jefferson Street (two blocks from Syracuse Hotel); 120 rooms. Single rooms, $5 and $5.50; double-bed rooms for two, $7 and $8; twin-bed rooms, $8.

Hotel Jefferson-Clinton, West Jefferson and South Clinton Streets (four blocks from Syracuse Hotel); 140 rooms. Single rooms, $5.50 to $8; double-bed rooms for two, $8 to $9; twin-bed rooms, $8 to $12.

Hilton Hotel, 238 Harrison Street (two blocks from Syracuse Hotel); 105 rooms. Single rooms, $5 and $6; double-bed rooms for two, $7 and $8; twin-bed rooms, $8.

Seymour Hotel, 361 East Onondaga Street (four blocks from Syracuse Hotel); 95 rooms. Single rooms, $3.50 and $4; double-bed rooms, $5.

Wood Hotel, West Jefferson and Clinton Streets, three blocks from Syracuse Hotel (55 rooms). Single rooms, $4 and $5; double-bed rooms, $5.50 and $7; twin-bed rooms, $6 and $8.

Truax Hotel, South Warren and Harrison Streets (one block from Syracuse Hotel); 50 rooms. Single rooms, $4.50; double-bed rooms, $7; twin-bed rooms, $7.50.

Motels and Motor Lodges

There are seven motels and tourist courts in Syracuse. Those wishing this type of accommodation may obtain a list of them with their locations and rates from the Chamber of Commerce, 351 South Warren Street, Syracuse 2.

Usually an advance deposit is necessary to hold a motel reservation.

Committees for the Meeting

Hardy L. Shirley is general chairman for the meeting. Assisting him is John R. Meyering. Their address is College of Forestry, State University of New York, Syracuse 10, N. Y.

Program Committee

Paul M. Dunn is chairman of the Program Committee. His address is St. Regis Paper Company, 150 East 42nd Street, New York 17, N. Y.

The other members of the committee are William R. Adams, Henry I. Baldwin, E. W. Littlefield, and Roy W. Olson.

Committee on Arrangements

S. O. Heiberg is chairman of the Committee on Arrangements. Assisting him is John W. Barrett. Both are with the College of Forestry.

Special assignments on this committee have been made as follows:

Ladies Activities. Mrs. Ralph Unger.

Information and Publicity. Ralph G. Unger.

Field Trips. Neil Stout.

Exhibits. Russell C. Deckert.

Hotels and Housing. Paul F. Graves.

Registration and Welcome. Floyd E. Carlson.

Meeting Rooms. Howard C. Miller.

Projection and Public Address Equipment. Wilfred Cote.

Forestry Films. John Fedkiw.

Banquet. Kenneth C. Painter.

College of Forestry Reception. Harold G. Wilm.

Alumni Reunions. Neil J. Stout.

Nominations for the Council

Seven calls for nominations to the Council that will hold office during the biennium 1958-1959 were published monthly in the JOURNAL, beginning with the February issue and continuing through August.

Nominations close September 18. No nominating petition will be valid if received in the Society's executive office after that date.

The Constitution provides that there shall be at least two candidates for the office of president (the runner-up is declared vice president) and at least nine candidates for membership on the Council. Inasmuch as this constitutional requirement has been met, by petitions submitted by the voting members, the Nominating Committee will make no nominations of its own, according to J. H. Johnson, Committee chairman.

Nominations Received

Up to the time of going to press the following nominations had been received:

For President

George A. Garratt, New Haven, Conn. (Vice president, 1956-1957).

Henry J. Malsberger, Atlanta, Ga.

For the Council

B. E. Allen, Savannah, Ga. (Council member, 1956-1957.)

Philip A. Briegleb, New Orleans, La. (Council member, 1956-1957.)

Donald E. Clark, Denver, Colo.

Chas. A. Connaughton, San Francisco, Calif.

Kenneth P. Davis, Ann Arbor, Mich.

M. B. Dickerman, St. Paul, Minn.

Glen R. Durrell, Stillwater, Okla.

M. K. Goddard, Harrisburg, Pa. (Council member, 1956-1957.)

Rudolph H. Grabow, Bedford, Ind.

William D. Hagenstein, Portland, Ore.

Dahl J. Kirkpatrick, Albuquerque, N. Mex.

P. T. Lannan, Georgetown, S. C.

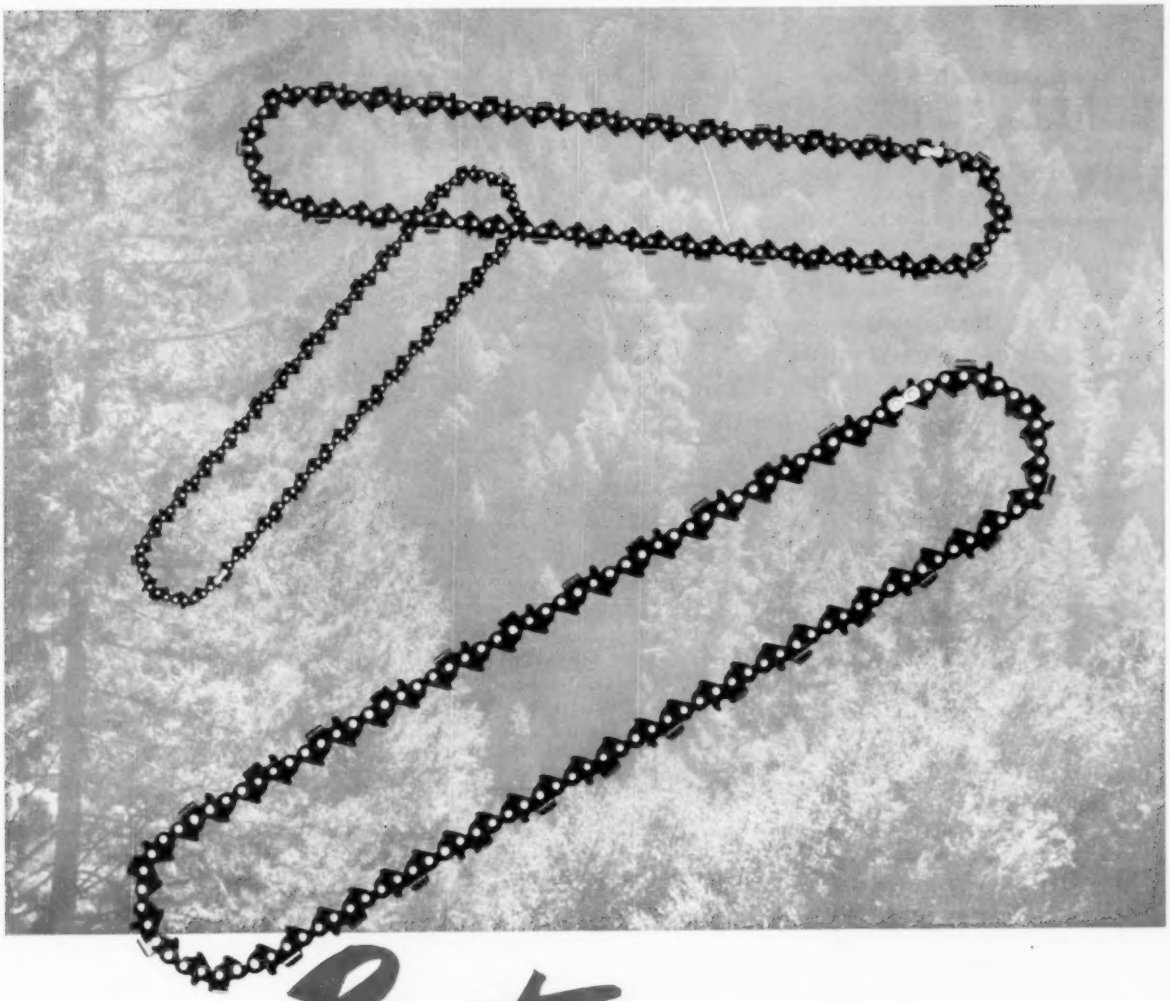
A. D. Nutting, Orono, Maine.

Russell Stadelman, Memphis, Tenn.

J. Herbert Stone, Portland, Ore. (Council member, 1956-1957.)

Henry J. Vaux, Berkeley, Calif. (Council member, 1956-1957.)

Ernest Wohletz, Moscow, Idaho.



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Nominations for Fellow

Seven calls for nominations to the grade of Fellow were published monthly in the JOURNAL, beginning with the February issue and continuing through August.

Nominations close September 18. No nominating petition will be valid if received in the Society's executive office after that date.

Fellow Nominations

On the date of going to press, the following Members had been nominated for the grade of Fellow:

Walter E. Bond, New Orleans, La.
C. Huxley Coulter, Tallahassee, Fla.
Charles C. Cowan, Seattle, Wash.
James F. Dubuar, Wanakena, N. Y.
Paul M. Garrison, Bogalusa, La.
S. R. Gevorkiantz, St. Paul, Minn.
Edwin F. Heacox, Tacoma, Wash.
Svend O. Heiberg, Syracuse, N. Y.
Norman G. Jacobson, Tacoma, Wash.
Richard Kilbourne, Norris, Tenn.
Harvey J. MacAloney, St. Paul, Minn.
Richard V. Miles, Jr., Tuscaloosa, Ala.
DeWitt Nelson, Sacramento, Calif.
Earl Porter, Mobile, Ala.
John A. Putnam, Leland, Miss.
Jacob M. Stauffer, Montgomery, Ala.
Philip C. Wakeley, New Orleans, La.
L. T. Webster, Olympia, Wash.

Section Officers

(As of August 1, 1957. Dates terms began are given.)

Allegheny Section

1-1-57

Ralph C. Wible, Chairman
Department of Forests and Waters, Harrisburg, Pa.
W. W. Ward, Vice Chairman
Pennsylvania State Forest School, Mont Alto, Pa.
Paul Felton, Secretary-Treasurer
Valley Forge Dist., Department of Forests and Waters, Port Kennedy, Pa.
W. W. Ward, Membership Chairman
Pennsylvania State Forest School, Mont Alto, Pa.
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2. Philadelphia
3. West Virginia

Appalachian Section

1-19-57

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H. F. Lathrop, Membership Chairman
Lightsey Brothers, Miley, S. C.
Chapters: 1. Edisto
2. Southeastern Virginia
3. Winyah

Central Rocky Mountain Section

7-1-56

Julian Bucher, Chairman
Kremmling Timber Co., Kremmling, Colo.
Gordon A. Ince, Vice Chairman
Box 1066, Colorado Springs, Colo.
Robert R. Alexander, Secretary-Treasurer
Rocky Mt. Forest & Range Expt. Station, Forestry Building, Colorado State University, Fort Collins, Colo.
Gordon A. Ince, Membership Chairman
Box 1066, Colorado Springs, Colo.
Chapters: None

Central States Section

9-10-56

Charles S. Walters, Chairman
University of Illinois, 219 Mumford Hall, Urbana, Ill.
C. I. Miller, Vice Chairman
Dept. Forestry and Conservation, Purdue University, Lafayette, Ind.
Alfred N. Liming, Secretary-Treasurer
Tyson Library, Versailles, Ind.
C. I. Miller, Membership Chairman
Dept. Forestry and Conservation, Purdue University, Lafayette, Ind.
Chapters: 1. Illinois Technical Forestry Association

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Columbia River Section

7-1-57

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1420 Olive Street, Salem, Ore.
Martin Syverson, Vice Chairman
1101 W. 48th St., Vancouver, Wash.
John Bell, Secretary
State Forestry Dept., 2600 State St., Salem, Ore.
Clyde H. Stratton, Treasurer
539 N.W. 10th Ave., Portland 9, Ore.
Robert Mason, Membership Chairman
754 East Judson, Salem, Ore.
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2. Capitol
3. Central Oregon
4. Coos Bay
5. Hawaii
6. Longview
7. Portland
8. Salem
9. Shasta-Cascade
10. Siskiyou
11. Tillamook-Clatsop
12. Umpqua
13. Willamette

Gulf States Section

7-1-57

James W. Craig, Chairman
Leavell Woods Rural Station, Jackson, Miss.
Jack S. Cooper, Vice Chairman
2932 36th St., Meridian, Miss.
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7-1-57

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Dept. of Forestry, Washington State College, Pullman, Wash.
Chapters: None

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3-10-56

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Chapters: None

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1-31-57

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7. Mid-Hudson
8. Upper Hudson

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6-1-57

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6-8-57

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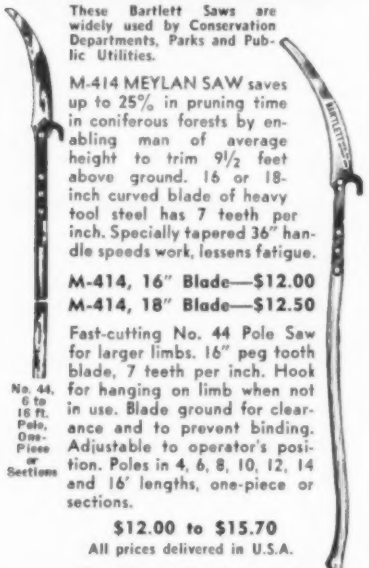

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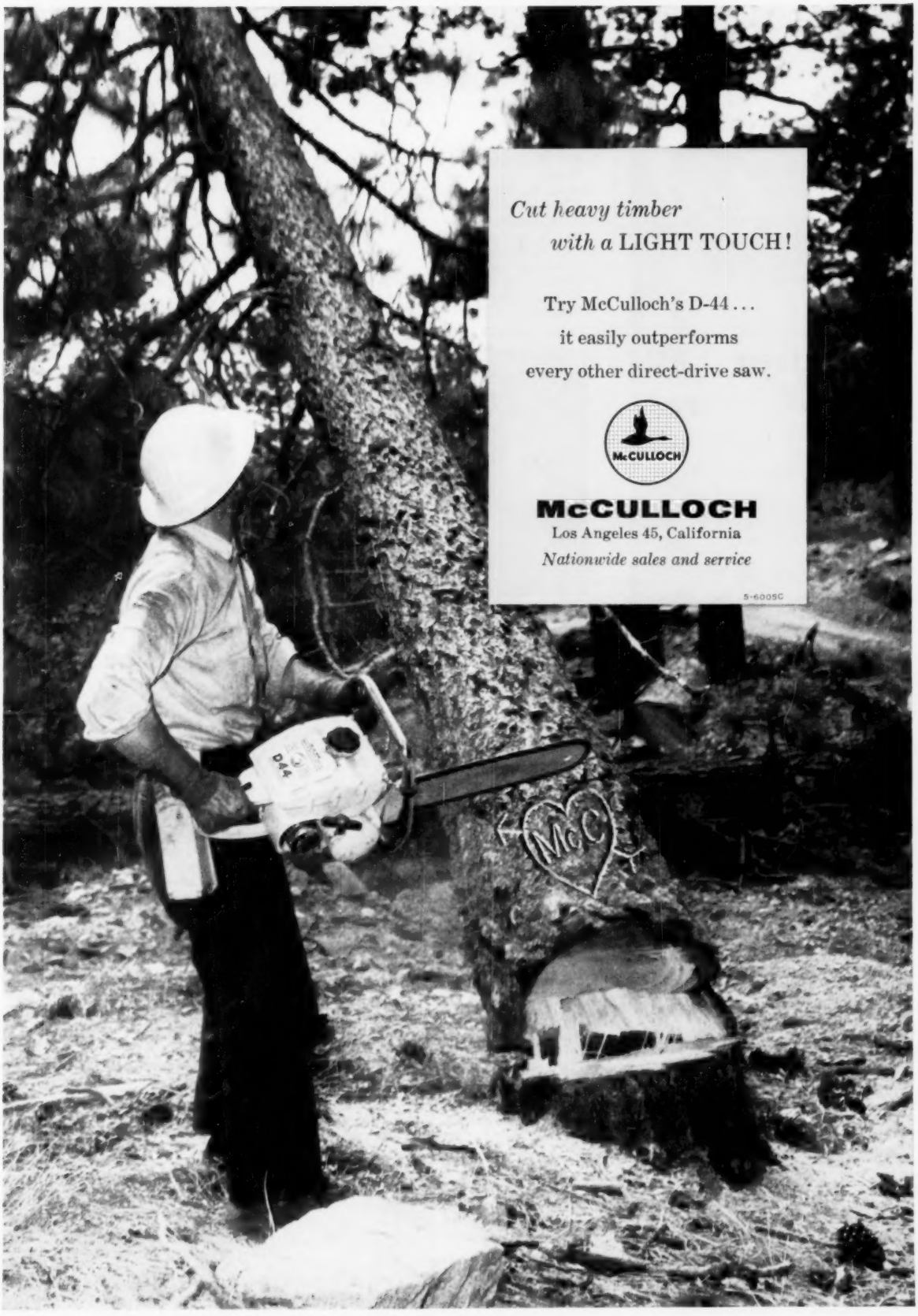
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3. Mid-Columbia
4. North Olympic
5. North Puget Sound
6. Southwest Washington

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Chapters: None

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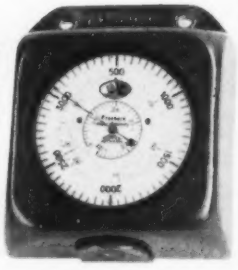

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Bernard Granum, Secretary-Treasurer
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3. North Dakota
4. Northwest Minnesota
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Chapters: 1. Hiawatha
2. Lower Michigan
3. Madison
4. Milwaukee
5. Northeastern Wisconsin

Northern California Section Meets

How research findings in timber and range management are being applied in northeastern California was inspected by some 150 members of the Northern California Section at its 1957 field meeting June 1 and 2.

Two pilot-plant tests of the Forest Service's California Forest and Range Experiment Station were the feature attractions. One was the ponderosa pine management work at Blacks Mountain Experimental Forest; the other, range management studies at Harvey Valley grazing allotment. Both are in Lassen County.

New officers of the Section were installed at a Banquet June 1 in Susanville, attended by 130 members and guests. Myron S. Wall, Jr., incoming chairman, presided in the absence of Leon R. Thomas, outgoing chairman who was recently transferred by the

SAF Membership by Sections (June 30, 1957)

	Section	Rank	Total	Junior	Member	Fellow	Affiliate	Associate	Student
1.	Allegheny	7	717	284	305	4	18	13	93
2.	Appalachian	5	757	266	394	4	33	4	56
3.	Central Rocky Mountain	15	271	74	143	1	6	5	42
4.	Central States	12	408	140	183	1	20	10	54
5.	Columbia River	2	1154	451	538	5	72	19	69
6.	Gulf States	3	882	304	371	2	111	22	72
7.	Inland Empire	20	220	78	99	2	8	5	28
8.	Intermountain	19	227	65	121	1	5	1	34
9.	Kentucky-Tennessee	17	241	72	140		14	8	7
10.	New England	9	591	161	290	7	58	14	61
11.	New York	11	423	108	222	4	22	15	52
12.	Northern California	4	792	304	357	9	51	18	53
13.	Northern Rocky Mountain	14	295	95	120		18	4	58
14.	Ozark	13	406	103	177	1	61	5	59
15.	Puget Sound	8	683	275	266	5	81	17	39
16.	Southeastern	1	1264	509	517	2	51	23	162
17.	Southern California	21	104	41	50	2	7	4	
18.	Southwestern	18	236	84	123	1	26	2	
19.	Upper-Mississippi Valley	10	462	120	203	3	24	11	101
20.	Washington, D. C.	16	256	38	177	11	2	28	
21.	Wisconsin-Michigan	6	734	210	341	4	67	17	95
	No Section Affiliation[1]		226	77	135	6	6	2	
	Corresponding Members		97						
	Honorary Members		20						
	Total Membership		11,466	3,859	5,272	75	761	247	1,135

[1]Includes members in the U. S. and foreign countries who have requested that they not be designated members of any Section.

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Oregon —Makes rehabilitation history in Tillamook Burn

In the high Coast Range mountains of Northwestern Oregon, early in the morning of August 24, 1933, a forest fire "blew up". In 20 hours 250,000 acres of one of the finest stands of timber ever grown was a sea of blackened snags—snags up to six and seven feet in diameter and larger, many reaching nearly 300 feet into the sky.

Two succeeding burns at six-year intervals covered a lot of the original burn and added 100,000 acres more to it. The timber kill was raised to 13.5 billion board feet.

The 'Tillamook Fire" became a historic fire.

Then, following this last fire of 1945, Oregon again came into the national limelight. The state had embarked upon the greatest forest rehabilitation project ever attempted by any agency in the nation, either state or federal. Made financially possible through state approval of a bond issue, there were no limitations in either finances or duration. The credit of the state backed the project.

It was a project without a pattern to follow. Its immensity was almost staggering. It had only a basic guiding policy: "Don't plant a tree or seed an acre of ground unless there is reasonable assurance that it can be protected from fire."

The millions of snags represented a most fertile field for the spread of fire. These had to come down. Loggers came in first and removed those which were good, sound timber. But millions of defective dead trees were left.

The plan called for snag-free corridors along ridges and across watersheds where necessary, dividing the burn into blocks for protection. Debris was burned and wide lines bulldozed down the center. In addition, the plan included roads, lookouts, equipment and personnel.

It is a challenging and wonderful task to rebuild a forest and, with it, the economy of the state. Today, 350,000 snags have been felled, 80,000 acres have been seeded and planted, 120 miles of road constructed and 1800 miles maintained. A hundred men work summer and winter on the job.

Things are looking up in the Tillamook burn. The first of the little trees are showing their tops above the brush and grass. In them is a promise . . . the promise of future logs for mills and plants, forests for the fisherman, the hunter and the camper—a place in which to work and a place in which to play.

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Forest Service to its Southern Region.

Wall announced the following staff: Elected positions—Harry C. Abraham, vice chairman, and Ezra M. Hornibrook, treasurer; appointed—Wayne G. Hubbard, secretary; Clyde M. Walker, editor; John A. Cameron, membership chairman; and Paul Cox, research committee chairman.

At Blacks Mountain Experimental Forest, Donald T. Gordon, project leader, explained the steps being taken to bring the virgin pine forest under regulation by application of unit area control. Key to management of this forest type, Gordon said, is to recognize that the forest is composed of many small units with different silvicultural requirements.

At Harvey Valley, August L. Hormay, Forest Service research center leader at Susanville, described the rest-rotation system of grazing that is being applied to restore the grazing capacity of rundown perennial bunchgrass range without reducing stocking on the allotment. The system, Hormay said, is based on the research finding that selective grazing by livestock is the chief cause of range deterioration.

At a brief business meeting June 2, members approved a resolution presented by the Section's research committee; it calls on the U. S. Forest Service to step up growth and yield studies in California to provide information essential to economic operation of timber stands.

John C. Kase (1906-1957)

John C. Kase of Mifflinburg, Pa., a wildlife management specialist with the Pennsylvania State Game Commission, died June 14, following a brief illness. He was born in Sunbury, Pa., November 19, 1906.

A 1929 graduate of the old Pennsylvania State Forest School at Mont Alto, Mr. Kase entered the Pennsylvania Department of Forests and Waters on various field assignments and served as research forester conducting wildlife and silvical studies.

He subsequently taught wildlife and forestry courses at Purdue University for several years, then returned to Pennsylvania to make ecological and habitat studies for the Game Commission.

Julius F. Kummel (1880-1957)

Julius F. Kummel, who for many years was the chief of the Section of Planting in the Regional Forester's Office in Portland, Ore., died May 23 at his home in Portland at the age of 77. He was born in Milwaukee, Wis. May 20, 1880.

After graduating from the University of Michigan Forestry School in 1907 Mr. Kummel entered the Forest Service in Colorado and in 1908 was assigned to the newly established district office of the Forest Service in Portland. He was the pioneer in seeding and planting in Oregon and Washington, and developed many techniques which have become standard practice.

In 1909 he established the first tree nursery in the Northwest, that at Wind River on the Gifford Pinchot (then Columbia) National Forest. At about the same time he built a forest seed extraction plant at Wyeth, Ore., the first of its kind. He was the co-author, with Charles A. Rindt and Thornton T. Munger, of "Forest Planting in the Douglas-fir Region," a standard reference on the subject.

Mr. Kummel retired from the Forest Service, after 35 years on planting work, in 1942. He first became a member of the Society of American Foresters in 1910.

Martin E. Baudendistel (1911-1957)

Martin E. Baudendistel, chief of forest economics research at the Pacific Northwest Forest and Range Experiment Station in Portland, Ore., died June 15 after a short illness. He was 46 years old.

Mr. Baudendistel spent 23 years in public forestry, mostly in the South and West where he worked on flood control and forest economics projects. During the period 1943-1946 he served as a technologist at the Forest Products Laboratory in Wisconsin.

In 1951 he joined the Portland staff and was assistant to the director of the Experiment Station during 1954 and 1955.

Born May 19, 1911 in Lockport, N. Y., he received a degree from the New York College of Forestry at Syracuse University in 1933.

SAF Consulting Foresters Directory to Be Published

Persons and firms listed in the SAF Consulting Foresters Directory, published in the January 1957 JOURNAL OF FORESTRY, have been requested by mail to approve, correct, or revise their listings for the new directory to be published in the

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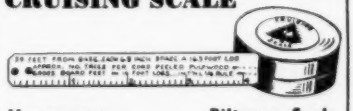

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January 1958 JOURNAL.

Members doing consulting forestry work and whose names have not previously appeared are invited to apply now for listing. They should provide complete information following the form used in the List of Consulting Foresters published in the January 1957 JOURNAL OF FORESTRY. Society membership is a prerequisite for listing. Such member must be in good standing, i.e., have paid their 1957 dues. Consulting firms will be listed if one or more of the partners or employees are members of the Society.

November 1, 1957 is the last date on which listings will be accepted for publication in the January 1958 directory.

Increase in Cost of Journal Binder

Increased manufacturing costs necessitate an increase in price to $3 of binders for the JOURNAL OF FORESTRY. This price will be effective as of December 1, 1957.

Binders hold 12 issues of the JOURNAL OF FORESTRY. They are of brown imitation leather, stiff board, square corners, lined. The title JOURNAL OF FORESTRY is stamped on front cover and backbone in gold foil.

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Coming Events

Ozark Section Meeting

The Ozark Section will meet September 5-7 in Branson, Mo.

Lake States Logging Congress

The 12th Annual Lake States Logging Congress will be held September 5, 6, 7 at Iron River, Mich.

Lake States Tree Improvement Conference

The Third Lake States Forest Tree Improvement Conference will be held at the University of Minnesota's North Central School of Agriculture, Grand Rapids, Minn., on September 17 and 18.

Further information about the program or reservations can be obtained by writing to Paul O. Rudolf, Executive Secretary, Lake States Forest Tree Improvement Committee, Lake States Forest Experiment Station, St. Paul 1, Minn.

National Watershed Congress

The National Watershed Congress is scheduled for September 23-25 in the Biltmore Hotel, Atlanta, Ga.

American Forestry Association

The 82nd annual meeting of the American Forestry Association will be held September 30-October 3, at Madison, Wis. Theme: "Wood Products on Parade."

Central States Section

Central States Section will meet October 3-4, at Herrin, Ill. Theme: "Forestry and Industry—A Partnership."

Western Forestry and Conservation Assn.

The Western Forestry and Conservation Association will hold its 48th annual conference December 11-13 in Seattle, Wash. Theme: "The business of tree farming."

Salem Foresters to Form New Chapter

The executive committee of the Columbia River Section authorized the establishment of a new Chapter July 1 in Salem, Ore. The decision was made at a meeting of the committee March 29 prior to the opening of the Columbia River Section's annual meeting March 30. Approximately 60 members are expected to join the new Chapter.

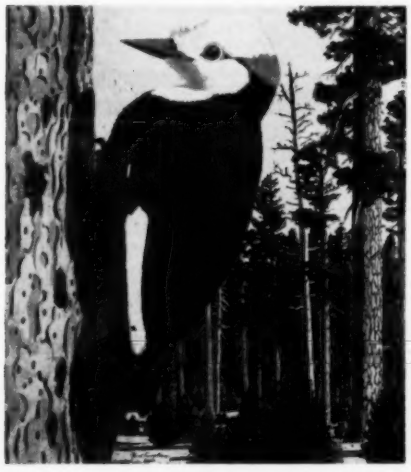
Columbia River Officers Announced

New officers of the Columbia River Section, elected this spring, began their duties July 1. Robert D. Hostetter of Salem, Ore. is the newly elected chairman. Martin Syverson, Portland, Ore., was elected vice chairman.

Other new officers, which were appointed by the Section leaders, are: secretary, John F. Bell, Salem, Ore.; treasurer, Clyde H. Stratton, Portland, Ore.; membership chairman, Robert L. Mason, Salem, Ore.

fire weather...a time of danger for America's forestlands

Insects and disease, as well as fire, are forest enemies. The beetle-infested pine tree at left must be harvested at once to save its wood and stop a beetle epidemic.



When summer sun bakes the land and arid winds dry out the trees, men in the woods go on the alert. This is *fire weather*, a time of danger when lightning, a wayward spark or a careless match can set an entire forest ablaze...destroying timber and other important forest resources. To hold such losses to a minimum, tree farmers have developed well-organized and carefully planned forest fire protection programs.

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Membership Applications and Advancements

Proposals for admission, advancement and reinstatements received in the Society office during the month of July are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of October 1, 1957. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Junior Grade

Snyder, J. L., Asst. Farm Mgr., Kunkletown, Pa.; Pa. State, B.S.F., 1954.

Students Eligible for Automatic Advancement

PENNSYLVANIA STATE UNIVERSITY

Metzger, R. H.

Appalachian Section

Student Grade

DUKE UNIVERSITY

Kipp, H. W.

Junior Grade

Sewell, C S., Forestry Agent, Atlantic Coast Line Railroad, Wilmington, N. C. (Reinstatement).

Member Grade

Edney, R. E., Asst. Logging Supv., U. S. Plywood Corp., Orangeburg, S. C.; Univ. of Ga., B.S.F., 1949, M.F., 1950. (Junior 1953).

Hughes, S. M., Forester, Acme Wood Corp., Acme, N. C.; N. C. State, B.S.F., 1952 (Junior 1953).

Affiliate Grade

Kidd, W. E., Forester, Va. Div. of Forestry, Salem, Va.

Morris, C. C., Service Forester, Va. Div. of Forestry, Waverly, Va.

Central Rocky Mountain Section

Junior Grade

Students Eligible for Automatic Advancement

COLORADO STATE UNIVERSITY

Barner, M. V. Jeglum, C. P.

Central States Section

Member Grade

Cooper, J. R., Procurement Mgr., Koppers Co. Inc., Marietta, Ohio. (Reinstatement).

Columbia River Section

Junior Grade

Students Eligible for Automatic Advancement

OREGON STATE COLLEGE

Fehly, R. E.

Member Grade

Krygier, J. T., Asst. Prof. Forest Mgmt., Ore. State College, Corvallis, Ore.; Utah State, B.S., Tbr. Mgmt., 1952, M.F., 1955. (Junior 1952).

Liming, G. E., Forester, Ga. Pacific Plywood, Newport, Ore. (Junior 1950).

Mounteer, R. W., Forester, Ore. State Forestry Dept., Coos Bay, Ore.; Mich. State, B.S.F., 1949. (Junior 1951).

Olson, L. V., Forester, Bur. of Land Mgmt., Roseburg, Ore.; Ore. State, B.S.F., 1952. (Junior 1952).

Stevens, T., Menasha Plywood Corp., North Bend, Ore. (Junior 1950).

Wagner, W. C., Sr. Forester, Ore. State Board of Forestry, Eugene, Ore.; Mich. State, B.S.F., 1952. (Junior 1953).

Gulf States Section

Junior Grade

Harsdorff, F. D., Asst. Chief Forester, Southwestern Settlement & Dev. Co., Jasper, Texas; Stephen F. Austin College, B.S. (Forestry), 1950. (Affiliate 1953).

Member Grade

Beal, R. L., Field Asst., International Paper Co., Brandon, Miss.; N. C. State, B.S.F., 1950. (Junior 1951).

Affiliate Grade

Wood, T. R., Asst. Ranger, USFS, Gloster, Miss.

Inland Empire Section

Student Grade

UNIVERSITY OF IDAHO

Peterson, T. R.

Intermountain Section

Member Grade

Deinema, J. W., Asst. Forester, USFS, Challis, Idaho. (Junior 1952).

Metcalf, M. E., Forester, USFS, Ogden, Utah. (Junior 1951).

Patee, R. K., Dist. Forester, USFS, Ashton, Idaho. (Junior 1951).

Kentucky-Tennessee Section

Member Grade

Hallberg, R. K., Asst. Dist. Forester, Hiwassee Land Co., Kingston, Tenn. (Junior 1951).

New England Section

Junior Grade

Melcher, W. D., Forester, S. D. Warren Co., Bingham, Maine. (Junior 1952).

Students Eligible for Automatic Advancement

UNIVERSITY OF MAINE

Burchard, D. B. White, J. B.
Finch, R. B. Wiklund, R. P.

Affiliate Grade

Kuss, F. R., Branch Mgr., Calif. Spray-Chemical Corp., New England Branch, Gilford, N. H.

New York Section

Junior Grade

McArthur, D. M., Work Unit Conservationist, USFS, Fort Edward, N. Y.; State Univ. of N. Y., B.S.F., 1949.

Students Eligible for Automatic Advancement

STATE UNIVERSITY OF NEW YORK

Towner, T. L.

Northern California Section

Junior Grade

Parker, J. R., Forester, East Bay Regional Parks, Oakland, Calif.; Ore. State College, B.S.F., 1932.

Member Grade

Bourgeois, P. A., Asst. Forester, Setzer Forest Products, Sacramento, Calif.; Univ. of Calif., B.S.F., 1953. (Junior 1953).

Countryman, C. M., USFS, Berkeley, Calif. (46R56).

Lancaster, R. G., Asst. Dist. Ranger, USFS, Orleans, Calif.; Univ. of Calif., B.S.F., 1951 (Junior 1952).

Malain, R. J., Asst. Forest Tech., Calif. Div. of Forestry; Univ. of Calif., B.S.F., 1950 (Junior 1951).

Nile, J. B., Asst. Dist. Forester, South Pacific Land Co., Mt. Shasta, Calif.; Univ. of Calif., B.S.F., 1952. (Junior 1952).

Striplin, H. A., Consultant, Sacramento, Calif. (Junior 1950).

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY

Duke, J. P.

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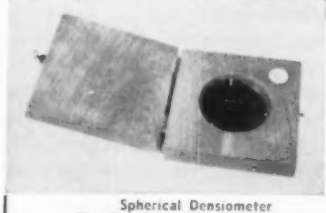

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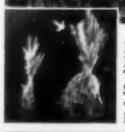

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Member Grade

Silvernale, C. W., Forester, USFS, Martinsdale, Mont.; Mont. State, B.S.F., 1949. (Junior 1952).

Ozark Section

Member Grade

Piepenbring, R. L., Asst. Dist. Supt., International Paper Co., DeQueen, Ark.; Univ. of Mo., B.S.F., 1949. (Junior 1949).

Roth, P. L., Research Forester, Kansas State College, Manhattan, Kansas; Purdue Univ., B.S.F., 1951, M.S.F., 1955. (Junior 1951).

Affiliate Grade

Tyree, B. P., Forest Tech., International Pulp & Paper Co., Hampton, Ark.

Wagner, G. J., Forester, International Paper Co., Arkadelphia, Ark.

Puget Sound Section

Member Grade

Cummins, P. J., Forest Inventory, Weyerhaeuser Tbr. Co., Enumclaw, Wash. (Junior 1950).

Flower, L. E., USFS, Tiller, Ore. (Junior 1950).

Guenther, W. J., Asst. Forester, Weyerhaeuser Tbr. Co., Raymond, Wash. (Junior 1950).

Jacobsen, R. S., USFS, North Bend, Wash. (Junior 36R56).

Johnson, C. M., Public Information Rep., Weyerhaeuser Tbr. Co., Tacoma, Wash.; Univ. of Wash., B.S.F., 1947, M.F., 1950. (Junior 1948).

Johnson, H. B., Forester, Northern Pacific Railway, Seattle, Wash. (Junior 1950).

Larson, W. O., Logging Eng., U. S. Plywood Corp., Kosmos, Wash., Univ. of Wash., B.S.F., 1942. (Junior 1951).

Levin, O. R., Forester, So. Olympic Tree Farm, Shelton, Wash. (Junior 1950).

Maki, A. T., Cruiser, Weyerhaeuser Tbr. Co., Centralia, Wash. (Junior 1950).

McCormack, H. E., USFS, Mineral, Wash. (Junior 1950).

McDonell, N. R., Forester, Weyerhaeuser Tbr. Co., Tacoma, Wash. (Junior 1950).

Murray, L. T., Forester, West Fork Tbr. Co., Tacoma, Wash. (Junior 1950).

Poust, A. A., USFS, Olympia, Wash. (Junior 1950).

Reeves, W. A., Forester, Weyerhaeuser Tbr. Co., Tacoma, Wash. (Junior 1950).

Affiliate Grade

Bartels, W. H., Dist. Administrator, Dept. of Natural Resources, Elbe, Wash.

Becia, E. E., Cruiser, Ketchikan Pulp Co., Ketchikan, Alaska.

Southeastern Section

Junior Grade

Gairns, W. O., Appraisal Supv., W. R. Sizemore & Co., Tallassee, Ala.; Univ. of Ga., B.S.F., 1953.

Harrell, B. D., Wood Procurement, Rayonier Inc., Fernandina Beach, Fla., (Reinstatement).

Loper, L. L., Forester, USS Corp., Fairfield, Ala. (Affiliate 1951).

Students Eligible for Automatic Advancement

UNIVERSITY OF GEORGIA

Carmichael, P. N.

Member Grade

Beasley, R. W., Advanced Utilization Classification, Baldwin, Ga. (Junior 48R55).

Boyd, W. P., Forest Tech., International Paper Co., Blountstown, Fla.; Univ. of Fla., B.S.F., 1949. (Junior 1952).

Dunn, H. V., Asst. Forester, Gulf States Paper Corp., Tuscaloosa, Ala.; API, B.S.F., 1952. (Junior 1952).

Felker, K. B., Sr. Forester, Rome Craft Paper Co., Gainesville, Fla. (Junior 1950).

Gilmer, W. D., Forester, Brunswick Pulp & Paper Co., Brunswick, Ga.; Duke, M.F., 1951. (Junior 1951).

Kent, N. C., Asst. Forester, Gulf States Paper Corp., Tuscaloosa, Ala.; API, B.S.F., 1951. (Junior 1952).

Martindale, D. L., Consulting Forester, G. E. Knapp, Macon, Ga.; Mich. State, M.S.F., 1951. (Junior 1951).

Merek, H. L., Forester, Union Bag-Camp Paper Corp., Savannah, Ga.; W. Va. Univ., B.S.F., 1951; Duke Univ., M.F., 1954. (Junior 1951).

Philips, H. L., Forester, U. S. Pipe & Foundry Co., Birmingham, Ala.; API, Forest Mgmt., 1948. (Junior 1951).

Seymour, H. K., Forester, International Paper Co., Chatam, Ala.; Univ. of Ga., B.S.F., 1953. (Junior 1953).

Touse, R., Mgr., Florida Crossarm Co., Gainesville, Fla.; (Junior 1950).

Wills, W. W., Forester, Rome Craft Co., Jasper, Ga. (Junior 1951).

Woodall, E. A., Asst. Scaling Supv., Georgia Kraft Co., Macon, Ga.; Univ. of Ga. B.S.F., 1951. (Junior 1951).

Affiliate Grade

Perry, T. O., Research & Teaching, Forest Genetics, Univ. of Fla., Gainesville, Fla.

Southern California Section

Junior Grade

Yates, C. A., Fire Control Off., USFS, San Bernadino, Calif.; Ore. State, B.S.F., 1948.

Southwestern Section

Junior Grade

Allen, T. R., Supt. of Moulding Plant, Southwest Lbr. Mills, Inc., McNary, Ariz.; Iowa State, B.S.F., 1950.

Upper Mississippi Valley Section

Member Grade

Kulman, H. M., Research Asst. Forest Entom., Univ. of Minn., St. Paul, Minn.; Pa. State, B.S.F., 1952; Duke Univ., M.F., 1955. (Junior 1952).

Ritter, W. C., Dist. Forester, Iowa Cons. Comm., McGregor, Iowa; Iowa State, B.S.F., 1952.

Wisconsin-Michigan Section

Junior Grade

Drury, H. P., Forester, Robert Washburn, Marquette, Mich. (Reinstatement).

Hatch, G. J., Forester, Abitibi Corp., Alpena, Mich.; Mich. State, B.S.F., 1938.

Johnson, N. I., Asst. Forest & Wildlife Ecology, American Box Board Co., Filer City, Mich.; Univ. of Mich., B.S.F., 1951.

Member Grade

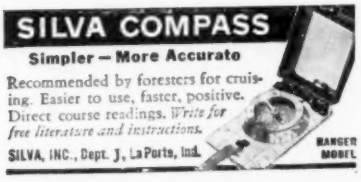
Bonner, D. F., Asst. Dist. Forester, Mich. Dept. of Cons., Sault Ste. Marie, Mich.; Mich. State, B.S.F., 1952. (Junior 1953).

Rausch, T. J., Dist. Forester, Wis. Cons. Comm., Madison, Wis. (Junior 1952).

No Section

Corresponding Grade

Tsu, H. H., Chief, Div. of Forest Policy, Taiwan Forest Adm., Taiwan, China; Univ. of Nanking, B.S., 1940.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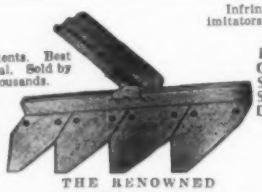
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Forestry News

Forest Fire Numbers Hit Record Low During 1956

The number of forest fires over the nation hit a record low in 1956, although the American people visited and used forest lands more than ever before, the U. S. Department of Agriculture has announced.

A total of 143,485 forest fires were reported in 1956 on private, state, and federal lands—a reduction of 1,695 from the 1955 figure. These figures were compiled by the U. S. Forest Service from reports of state and federal fire fighting agencies.

Despite this favorable showing in fire protection, a forest fire was reported on an average of every 3½ minutes during 1956.

Improvements noted in the 1956 fire picture included progress in forest fire prevention in the South, fewer man-caused fires, and a reduction in the number intentionally set.

Man-caused fires dropped 5 percent. This decrease is attributed largely to organized prevention campaigns carried on by federal and state agencies, industries, private organizations, and individuals. Most popular of these are the Smokey Bear campaign conducted by the Forest Service and state foresters under sponsorship of The Advertising Council, and the Keep Green programs conducted by states and forest industries.

Improved equipment and better methods of fighting fires are credited with reducing the area burned by 1,462,707 acres, down to 6,605,894 acres in 1956. Contributing to this decrease was the fact that organized forest fire protection was extended to an additional 3,148,000 acres, bringing the 1956 total to 607,032,000 acres under protection.

The South shows considerable improvement in its forest fire protection. In 11 states between North Carolina and Texas, the number of fires were reduced by 6,372 from the 1955 total of 109,082. Acreage burned also dropped sharply, from 6,781,536 in 1955 to 5,290,217 acres in 1956—a reduction of 1,491,319 acres.

Much of this improvement was attributed to the Southern Forest Fire Conference of 1955, and followup meetings in each state, at which fire fighting agencies, law enforcement agencies, and other interested groups planned a campaign to protect woodlands from fire. As part of this program, organized protection covered 157,906,000 acres in the South last year, compared to 155,619,000 acres in 1955. *(Continued next page)*

STATUS OF CERTIFIED TREE FARMS AS OF JULY 1, 1957, AS TABULATED BY AMERICAN FOREST PRODUCTS INDUSTRIES, INC., NATIONAL SPONSOR OF THE TREE FARM PROGRAM

Region	Number tree farms		Total Acreage	
	Jan. 1, 1957	July 1, 1957	Jan. 1, 1957	July 1, 1957
Southern States	5,113	5,540	26,650,054	28,169,233
Western Pine Region	1,121	1,184	6,233,147	6,275,734
Douglas Fir Region	397	432	4,831,677	4,985,847
Redwood Region	43	47	330,792	335,833
Lake States	1,046	1,083	2,343,032	2,365,552
Central States	628	682	286,604	296,415
Plains States	216	221	42,187	42,417
Eastern States	1,030	1,112	830,724	886,934
Total for 45 states	9,594	10,301	41,548,217	43,357,965

NOTE: The above report shows the *net* gains and *net* losses for the first six months of 1957.

States by regions

South: Ala., Ark., Fla., Ga., La., Miss., N. C., Okla., S. C., Tenn., Tex., and Va.
Redwood: Redwood Region of Calif.
Douglas Fir: Western Ore. and western Wash.
Western Pine: Ariz., Calif. (except Redwood Region), Colo., Idaho, Mont., Nev., N. Mex., eastern Ore., Black Hill Region of S. D., Utah, eastern Wash. and Wyo.
Lake States: Mich., Minn. and Wis.
Central States: Ill., Ind., Ky., Mo. and Ohio.
Plains States: Iowa, N. Dak., and Plains of S. Dak.
Eastern States: Conn., Maine, Md., Mass., N. H., N. J., N. Y., Penn., R. I., Vt. and W. Va.

Interest in tree planting, which has grown in that region during the past year, according to the Forest Service, also contributed to the reduction in fires.

On the debit side, incendiarists, found largely in the South, still top the list of fire causes on protected lands. (Figures are not available on unprotected land.) The 1956 record is improved on this score, however. There were 1,758 fewer fires set deliberately, a reduction from 25,773 in 1955 to 24,015 in 1956."

Debris burners and smokers rank second and third on the list of man-caused forest fires. Debris burners set 21,436, while smokers trailed close with 16,643 fires for the year. These three causes have been at the top of the list for some time, though figures indicate that people are slowly becoming more careful with fires in the forest.

Botanist Dies

Dr. Ernst A. Bessey, internationally known botanist, died at his home in East Lansing, Mich. July 17, at the age of 80. Born at Ames, Iowa, Feb. 20, 1877, he was the son of Charles Edwin Bessey, also widely known as a botanist.

After graduation from the University of Nebraska, Dr. Bessey studied abroad, receiving his Ph.D. in 1904. He returned to this country and worked in various capacities for the federal government, including plant explorer, until in 1910 he joined the faculty of Michigan Agricultural College (State University). He served on that faculty until retirement and was teacher and friend to many early American foresters.

R. C. Ernst Appointed Assistant Secretary for Lands

Roger C. Ernst of Phoenix, former Arizona state lands commissioner, is the new Assistant Secretary of the Interior for Public Land Management.

Mr. Ernst, nominated for the post by President Eisenhower, took office June 19. He succeeds Hatfield Chilson who was elevated to Under Secretary of the Department. He was Arizona land commissioner from December 1953 until January 1957 when he became executive secretary for the Central Arizona Project Association. In that capacity he was responsible for conservation and development of lands, water, and minerals in Arizona.

USDA Proposes Standards for Christmas Trees

U. S. Standards for Christmas trees have been proposed by the U. S. Department of Agriculture. They were developed at the request of the National Christmas Tree Growers Association and several state associations.

The proposals provide for three grades: U. S. Premium, U. S. No. 1, and U. S. No. 2. Factors given principal consideration in the various grades are density, taper, balance, freshness, and freedom from deformities.

Commercial production of Christmas trees during the 1956 season was estimated at about 25,000,000 trees. In addition, about 4,000,000 trees were imported. In general, the states bordering Canada are the leading states in Christmas tree production. The majority of the Christmas trees marketed are one of the following species: Douglas-fir, balsam fir, black spruce, eastern red cedar, white spruce, and scotch pine.

Discontinues Establishment of Sustained Yield Units

The U. S. Department of Agriculture has decided to discontinue for the foreseeable future further establishment of both federal and cooperative sustained Yield Units under the Act of March 29, 1944.

It will continue its present arrangement with the Simpson Lumber Co., Washington, and five established Federal Units in New Mexico, Arizona, California, Oregon, and Washington will also be continued for the present time. The desirability of continuing federal units will be examined from time to time at not less than five-year intervals.

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Forest Products Research Society Meets

The Forest Products Research Society's 11th National Meeting was held at Buffalo, N. Y., June 24. It was the organization's third largest, with registered attendance of 684 persons, plus an estimated 100 non-registered visitors.

More than fifty papers were presented at twelve technical sessions and thirteen division meetings which covered the entire range of wood technology from logging and lumber manufacturing through to finished wood products and chemical utilization.

Dr. Frank H. Kaufert, director, School of Forestry, University of Minnesota, was installed as president for the coming year. Other officers and board members elected to fill vacancies included, president-elect, W. Jeter Eason, vice president, Nickey Bros., Inc., Memphis, Tenn.; vice president, Ellwood S. Harrar, dean, School of Forestry, Duke University, Durham, N. C.; Northwest Region board member, T. S. Veazey, Jr., engineer, The Anaconda Company, Butte, Mont.; and Northeast Region board member, Donald K. Saunders, president, Saunders Brothers, Westbrook, Maine.

The 12th National Meeting of the Society will be held in the city of its National Headquarters, Madison, Wis., June 22-27, 1958.

Private & Industrial

Simpson Chief Research Forester Named

Appointment of Theodore R. Yocom, 39, as chief forester of Simpson Timber Company's Central Research Department was announced in July by C. H. Kreienbaum, vice chairman. Yocom assumed his new duties in Seattle immediately.

In this position, Yocom will plan long-range development of the company's timberlands in Washington, Oregon, and California. His appointment completes the initial Central Research staff, Kreienbaum stated. Previously named were William A. McKenzie, chief engineer; Robert J. Seidl, director of the Central Research Laboratory; and Don A. Proudfoot, marketing director.

Since 1952 Yocom has served as chief forester of the Ketchikan Pulp Company, Ketchikan, Alaska. Previously, he was with Weyerhaeuser Timber Company in Everett and Longview. A native of Logan, Iowa, Yocom is a graduate of Iowa State College and also studied at Oregon State College.

Heads C of C Natural Resources Committee

Appointment of David L. Francis, president of the Princess Elkhorn Coal Company, Huntington, W. Va., as chairman of the Natural Resources Committee, Chamber of Commerce of the United States, was announced in July by Chamber President Philip M. Talbott. Mr. Francis also is a director of the Chamber.

With representation from all parts of the country, the 43-member committee helps to guide National Chamber policy on issues affecting coal, electric power, federal lands, forestry, mining, oil and gas, and water resources.

Committee members representing the forest industries, all of whom were reappointed are: William R. Graham, Pocahontas Land Corporation, Bluefield, W. Va.; Peter D. Joers, Dierks Forests, Inc., Hot Springs National Park, Ark.; Bernard L. Orell, Weyerhaeuser Sales Company, St. Paul, Minn.; Earl Porter, Manager, Woodlands Department, Southern Kraft Division, International Paper Company, Mobile, Ala.; Stuart Moir, Western Forestry & Conservation Assn., Portland, Ore.; and E. C. Rettig, Potlatch Forests, Inc., Lewiston, Idaho.

Wood Technologist Joins Staff of TECO Laboratory

Sheldon Greene, wood technologist and graduate of Yale University, School of Forestry, has joined the Washington, D. C. laboratory staff of Timber Engineering Company, research affiliate of the National Lumber Manufacturers Association, according to N. V. Poletika, director of research.

Greene received a B.S. degree in forestry from the University of Massachusetts. He is a June 1957 graduate of the Yale School of Forestry, and holds a masters degree in forestry and wood technology.

Harold W. Hicks Joins Consulting Firm

The consulting firm of Southern Timber Management Service, Inc., Birmingham, Ala., has recently announced the opening of a branch office in Mobile, Ala., under the management of Harold W. Hicks. Formerly with the Corps of Engineers at Mobile, Mr. Hicks has also previously worked for the Soil Conservation Service and the U. S. Forest Service. He is a forestry graduate of Montana State University and Yale University.

Education

Forestry Attains School Status in Missouri

President Elmer Ellis announced that effective July 1 the Department of Forestry at the University of Missouri became a full School of Forestry, operating within the Division of Agricultural Sciences and having a director as its administrative head.

Dr. Ruthford H. Westveld, chairman of the department since its establishment in 1947, has been named director of the new school.

Forestry instruction leading to a degree was first offered at the University of Missouri in 1912 in a department of forestry which was discontinued in 1921. The instruction was re-established in January 1936, when a two-year pre-forestry curriculum was established in the department of horticulture and forestry. This continued until the summer of 1946 when a four-year curriculum leading to the degree of Bachelor of Science in Forestry was set up in the department of horticulture and forestry. In July of the following year the separate department of forestry was re-established and Dr. Westveld was appointed professor and chairman of the department. The department was accredited by the Society of American Foresters in 1950.

Clemson to Offer Four-Year Curriculum

A full four-year forestry curriculum is being initiated at Clemson College with the beginning of the fall term, President R. F. Poole has announced.

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The new curriculum, leading to a bachelor's degree, will be offered by the Department of Forestry in the School of Agriculture, replacing a two-year pre-forestry program. Freshman, sophomore, and junior courses will be offered in 1957-58 with the senior courses beginning in September 1958.

Dr. K. Lehotsky is forestry department head.

Graduate Training in Continuous Forest Control Offered by Purdue

A graduate program of study in Continuous Forest Control is being offered by the Purdue University Department of Forestry and Conservation, Lafayette, Ind. Continuous forest control, embracing a system of survey, resurvey, and rapid data analysis necessary for prompt management decisions, is being widely applied in modern forest management. The course of graduate study at Purdue in this field, leading to the degree Master of Science in Forestry, has been established to provide the training needed for the application of these methods while also offering graduate level study in administration and management, economics, statistics, and allied fields.

Bernhardt Appointed to Research Position

Robert W. Bernhardt has recently been appointed to a newly created research position on the Archer and Anna Huntington Wildlife Forest at Newcomb, N. Y. He reported at the Huntington in June to begin work with Dr. William L. Webb and Mr. Earl F. Patric in the wildlife research program.

The Huntington Wildlife Forest is a 15,000 acre property of the State University of New York, College of Forestry. This Adirondack forest area is devoted largely to research in wildlife and the development of wildlife management measures in forested areas. Bernhardt's work in this area will deal especially with problems related to the management of aquatic habitats in forest areas. He holds a B.S. degree in forestry from the College of Forestry at Syracuse, and recently completed his M.S. degree in wildlife management.

Forester Added to Central States Staff

Samuel F. Gingrich has recently joined the staff of the Central States Forest Experiment Station. He will be stationed at the headquarters office in Columbus, Ohio, and will work in the Division of Forest Management Research. Gingrich will specialize in the field of mensuration and will be responsible for this aspect of all management studies.

For the past five years Gingrich has been an instructor in forestry at Pennsylvania State University.

Gingrich is a graduate of Penn State where he earned the B.S. and M.S. degrees. During World War II he served in the U. S. Navy Air Corps.

Public

New Personnel Director for Forest Service Named

Lynne M. Correll, assistant regional forester in California, was named Director of Personnel for the Forest Service effective July 28, the U. S. Department of Agriculture has announced.

Mr. Correll succeeds Bernard A. Anderson, who has accepted a position as chief of personnel for the Food and Agriculture Organization of the United Nations at Rome. Mr. Anderson, personnel director since 1954, left for his new post in August. He has served more than 30 years with the Forest Service.

In his new position Mr. Correll will be responsible for the training, safety, recruitment, and placement of all Forest Service personnel throughout the country, Alaska, and Puerto Rico.

A native of Bayard, Iowa, Mr. Correll received his A.B. degree from Iowa State College in 1925 and his Master's degree in forestry in 1926. He is a member of the Society of American Foresters, the Society for Personnel Management, the Federal Council of Personnel Administration, and the Federal Businessman's Association.

Mr. Anderson, born in St. Paul, Minn., received his B.S. degree in forestry from the University of Washington in 1927 and his Master's degree in forestry from the University of Idaho in 1928.

Oregon Forestry Department Changes Announced

Promotions and transfers of officials in the Salem office of the Oregon state forestry department, effective July 1, were announced recently by State Forester Dwight L. Phipps.

Edward Schroeder, assistant state forester in charge of state-owned forest lands, has been promoted to the

office of deputy state forester, a position that has been vacant for some months, and Vance L. Morrison, assistant state forester in charge of the services division, took over Schroeder's work.

Don Maus, personnel director, has been promoted to assistant state forester in charge of the services division; and William Hughes, executive assistant in the division has taken charge of the personnel section.

D. A. Craig Promotion Announced

Douglass A. Craig has been promoted to assistant regional forester in the Southern Regional Office of the U. S. Forest Service, in Atlanta, Ga. according to an announcement by Regional Forester C. Otto Lindh. He will head the Division of State and Private Forestry.

Craig, who has worked in the Branch of Program Planning in the Washington Office of the Forest Service for the past year, worked in the Division of State and Private Forestry in Atlanta for five years prior to his transfer to Washington. Four years were spent in general forestry assistance work and one year in charge of the cooperative forest management program.

A native of Detroit, Mich., he received his B.S. degree in forestry at Michigan State College in 1935. He served in the U. S. Army for 4½ years during World War II as a lieutenant colonel in the Pacific Area.

Heads California Fire Research

Carl C. Wilson has been appointed chief of the Division of Forest Fire Research at the California Forest and Range Experiment Station of the U. S. Forest Service, it has been announced by Dr. R. Keith Arnold, station director.

In his new assignment in which he succeeds Arnold, Wilson will be responsible for four broad fields of research in the California Region: the physics and chemistry of combustion, forest fire behavior, fire fighting and prevention methods, and use of fire in land management. He has been a member of the station staff since January 1956, previously having served 10 years in California as fire-control technician or district ranger. A graduate of the University of Idaho School of Forestry in 1939, Wilson earned the M.S. degree in forestry at University of California in 1941.

Zillgitt Transfers to Asheville

Walter M. Zillgitt, took over new duties in August as chief of the Division of Forest Management Research at the Southeastern Forest Experiment Station in Asheville, N. C., according to an announcement by the U. S. Forest Service. He succeeds Carl E. Ostrom, who has been promoted to the Washington office of the Forest Service to head up federal forest management research.

Mr. Zillgitt has been in charge of forest management and forest disease research at the Intermountain Forest and Range Experiment Station in Ogden, Utah. He is a graduate of the University of Minnesota with a degree in forestry and received his M.S. degree in forestry from the University of Michigan.

Harry W. Camp Transfers to Washington

Harry W. Camp, head of forest economics research of the Intermountain Forest and Range Experiment Station, has been advanced to staff assistant in the office of the Chief of the Forest Service, Washington, D. C.

Mr. Camp has been in charge of economics research in Ogden, Utah since 1954. During that time he spent four months in Iran as technical advisor to the government of that country on forestry matters. Since graduating from the University of California in 1933 he has held administrative positions in a half dozen national forests in addition to research assignments in four different experiment stations in both the East and the West.

Camp is vice chairman of the Intermountain Section, SAF.

Successor as head of economics research at the Intermountain Station will be E. V. Roberts, transferring from a similar position with the California Forest and Range Experiment Station at Berkeley.

Roberts Moves to Intermountain Station

Eugene V. Roberts, formerly chief of the division of Forest Economics at the California Forest and Range Experiment Station, began similar duty at the Intermountain Forest and Range Experiment Station on August 4, Director Reed W. Bailey has announced. Mr. Roberts has been at the California station since 1950, and replaces Harry W. Camp, who was transferred recently to Washington, D. C. for duty on the staff of the Chief of the Forest Service.

Linstedt Heads New Soils-Watershed Division

Greater emphasis has been placed on soils, water, and watershed management on national forest lands in the Pacific Northwest Region through the creation of a new unit with full divisional status, according to an announcement by Regional Forester J. Herbert Stone at Portland, Ore. Kermit W. Linstedt, regional fire control chief for the past eight years, is chief of the new Division of Soils and Watershed Management. His replacement will be Alfred E. Spaulding, present fire control chief in the Northern Regional Office at Missoula, Mont.

New Research Center Leader at Athens

Benjamin A. Roach has recently been appointed research center leader of the Athens (Ohio) Forest Research Center, a branch of the Central States Forest Experiment Station.

Mr. Roach has been with the station for seven years. During the past two years he has helped organize and develop the research program of the newly established research center in Berea, Ky. Prior to that Roach spent nearly five years as superintendent of the station's Kaskaskia Experimental Forest in southern Illinois.

Otis L. Copeland Transfers to Ogden, Utah

Dr. Otis L. Copeland, Jr., who has served as forestry soil scientist at the Inland Empire Research Center of

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the Intermountain Forest and Range Experiment Station at Spokane, Wash., since 1954 has been promoted to a similar position in the Division of Watershed Management Research at the Ogden headquarters of the station, according to Reed W. Bailey, director.

Trimble Heads Research Center

George R. Trimble, Jr., has been appointed leader of the Mountain State Research Center of the Northeastern Forest Experiment Station at Elkins, W. Va. The appointment was announced by Dr. Ralph W. Marquis, director of the Station.

Trimble succeeds Sidney Weitzman, who left the research center last fall to become chief of the Division of Watershed Management Research at the Lake States Forest Experiment Station, St. Paul, Minn.

S. F. Potts Retires

The retirement of Samuel Frederick Potts, entomologist, after 32 years of federal service has been announced by Dr. Ralph W. Marquis, director of the Northeastern Forest Experiment Station.

Mr. Potts, a member of the staff of the Experiment Station's Forest Insect and Disease Laboratory at New Haven, Conn., has been a pioneer in the use of concentrated insect sprays. He was the recipient of a U. S. Department of Agriculture Merit Award in 1948 for developing the concentrated spray method for ground and aerial application; the 1950 Merit Award of the Connecticut Tree Protection Association, as the person who had done most for conservation and tree protection in that state for that year; and the 1952 Nash National Conservation Certificate of Merit.

Products & Equipment

Logging Film Available

The growth of the pulpwood industry is shown in a new motion picture entitled "Pulpwood Logging," produced by Caterpillar Tractor Co.

The 23½-minute sound-color film covers pulpwood logging under varying conditions in the United States and Canada. The wide range of jobs includes logging operations in the thick underbrush and tough palmetto of sunny Georgia and the dense snow-drifted forests of the Pacific Northwest. Woods operations are comprehensively covered with details of forest site preparation, cutting, hauling, and loading logs for mill delivery.

"Pulpwood Logging" also features the importance of mechanization. The film is available through a Caterpillar dealer or by writing the Advertising Division, Caterpillar Tractor Co., Peoria, Ill.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

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Box B, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S. (Forestry) Arkansas A & M 1954, M.F. (Management) Yale 1955. Age 25, married, one child. Four summer seasons experience with forestry department of pulp and paper company in Arkansas. Desire position with private industry in the South. On active duty United States Army; available November 15, 1957.
Box C, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S. Auburn, 1949. Age 37, married, two children. Experienced in timber and land management, cruising, mapping, procuring wood, and conservation work with small land owners. Previous experience six months with sawmill and six years with a pulp and paper company. Desire position in South or Southeast with either pulp company or large lumber industry.
Box D, Journal of Forestry, Mills Building, Washington 6, D. C.

A major step forward in forest site preparation

In cooperation with the Brunswick Pulp & Paper Co., Caterpillar Tractor Co. recently conducted a three months' study of different forest site preparation methods near Brunswick, Ga. Some 700 acres in three areas were cleared and planted in trees. Six track-type Caterpillar Diesel machines, ranging in horsepower from 63 to 320, were used. Attachments included Rome offset disc harrows . . . Fleco rakes . . . stumpers and cab guards . . . Hyster stump driver and winch . . . anchor-type chain. Each tractor and attachments worked the length of time needed to provide a "dollars and cents" yardstick of production results. Some operational pictures are shown here. The results have been compiled on the following subjects: Stump Treatment . . . Stump Clearing and Tree Cutting . . . Chaining . . . Raking and Windrowing . . . Harrowing. For information, write Caterpillar Tractor Co. or call your nearby Caterpillar Dealer.

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SHEARING AND STUMPING: A CAT* D8 Tractor with a Rome K.G. blade at work in dry sandy soil, cleared except for standing live oaks ranging in diameter from 18" to 81". Trees were hit by stinger at height of 3' to 4' above ground level, sliced and pushed over. Stump tops were sheared at ground level by stinger and cutting edge in one or several passes.

RAKED AND WINDROWED: Typical area after raking and windrowing. Machines used: Caterpillar D9, D8 and D7 Tractors and No. 977 Traxcavator* with rakes. The more dense areas were cleared by the D9, the less dense by the other machines. Areas consisted of live oaks and mixed hardwoods with an understory of palmetto, gall berry, myrtles and vines.

HARROWING: A D8 with heavy-duty offset harrow on the job after an area of upland hardwood, mixed pine and heavy brush had been chained, raked and stumps cut at ground level. The number of passes—one or two—on an operation like this is up to the individual forest owner. After preparation, areas were planted by a D2 and D4 with tree planters.

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